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THE FORAMINIFERA OF THE ATLANTIC OCEAN

PART 2. LITUOLIDAE

BY

JOSEPH AUGUSTINE CUSHMAN
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INTRODUCTION.

This paper is the second part of a work the intent of whic is to describe and illustrate the Foraminifera of the Atlantic Ocean, especially those species which have occurred in the waters adjacent to the shores of the United States, including the whole of the Gulf of Mexico and the Caribbean Sea, that being the area in which most of the work of the vessels of the United States engaged in dredging work has been done. This part includes only the family Lituolidae. The first part issued in 1918 included the family Astrorhizidae.

JOSEPH AUGUSTINE CUSHMAN.

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THE FORAMINIFERA OF THE ATLANTIC OCEAN.

LITUOLIDAE.

By Joseph Augustine Cushman,
Of the Boston Society of Natural History.

INTRODUCTION.

This second part of the work on the Atlantic Foraminifera deals entirely with the Lituolidae, the family naturally following the Astrorhizidae, which has already been taken up in Part 1 of this work. The same arrangement of data is here followed. The classification is that adopted in Part 1 of my work on the North Pacific Foraminifera. The distribution of various species shows perhaps more clearly than in Part 1 the faunal areas developed in the western Atlantic.

SYSTEMATIC PART.

A systematic presentation of the various groups of the families follows:

Family 3. LITUOLIDAE.

Test consisting typically of two or more chambers connected with one another, arranged in a linear, planospiral, or trochoid, coiled or irregular series; wall of agglutinated material, the relative amounts of cement and foreign material varying greatly; apertures usually one to each chamber, but sometimes several.

Typical tests of this family are clearly of agglutinated material from which they differ from certain parallelisms in other families. The cement is characteristically ferruginous, a reddish brown in color, although occasionally specimens occur where the entire test is whitish and in numerous species, especially in fresh or alcoholic specimens or sometimes in dried material, the portion of the test next the aperture is often whitish. Throughout the family as here modified the test is composed of two or more chambers with a definite proloculum. The exception to this is the case of very large megalospheric specimens of *Hormosina globulifera*, for instance, where there is but a single chamber instead of the several chambers of the typical microspheric test.

There seems to be a definite development of complexity of structure from the linear series of *Reophax* and *Hormosina* through the close-coiled planospiral *Haplophragmoides* to the uncoiled *Ammobaculites* in the more highly developed species of which the early coiling is very much reduced.

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The classification of the family and the various genera used in an earlier work [1] is here followed. The need for these changes seems very evident on a further study of the material from the Atlantic. The idea of keeping separate the agglutinated tests from others of similar form but of secreted calcareous material is also strengthened by further study.

As already noted in the previous part on the Astrorhizidae the distribution of certain species seems to be very limited. Certain species described from the European side of the Atlantic have not been found on the American side, and the reverse is true in a few cases. Certain of the species of the western Atlantic seem to be related to those of the Indo-Pacific.

Subfamily 1. ASCHEMONELLINAE.

Test composed of agglutinated material, divided irregularly into chambers without definite plan of arrangement.

Both species of *Aschemonella* from the Atlantic are identical with those from the Pacific and are primitive in character. The irregularly placed apertures and the budding off of new chambers without definite arrangement are both primitive characters, and on this basis are separated from the rest of the family.

Genus ASCHEMONELLA H. B. Brady, 1879.

Astrorhiza (part) NORMAN, Proc. Roy. Soc., vol. 25, 1876, p. 213.

Aschemonella H. B. BRADY, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 42.—BÜTSCHLI, in Bronn, Klassen und Ordnungen des Thierreichs, vol. 1, 1880, p. 195.—CHAPMAN, The Foraminifera, 1902, p. 126.—CUSHMAN, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 80.—Type, *Aschemonella catenata* (Norman)= *Astrorhiza catenata* Norman.

Description.—Test free, composed of a number of tubular or inflated chambers in a single or branching series, size and form irregular, walls arenaceous, firm, thin, apertures often several at the end of the tubular necks.

The following species are recorded from the Atlantic, both being essentially deep-water species:

ASCHEMONELLA RAMULIFORMIS H. B. Brady.

Plate 1, fig. 1.

Aschemonella ramuliformis H. B. BRADY, Rep. Voy, *Challenger*, Zoology, vol. 9. 1884, p. 273, pl. 27, figs. 12–15.—CUSHMAN, Bull. 71, U. S. Nat. Mus., pt, 1, 1910, p. 81, fig. 110.—PEARCY, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1005.—HERON-ALLEN and EARLAND, Trans. Zool. Soc. London, vol. 20, 1915, p. 610, pl. 46, figs. 18, 19.

Description.—"Test free, elongate; forming an irregular, more or less branched, sometimes segmented tube, with numerous apertures, lateral and terminal. Walls very thin, but hard and firmly cemented;

[1] Cushman, Foraminifera of the North Pacific, Bull. 71, U. S. Nat. Mus., pts. 1–6, 1910–1917.

exterior only slightly rugose, interior surface smooth. Length, $\frac{1}{3}$ inch (8 mm.)."

Distribution.—Scattered Atlantic stations, mostly from considerable depths, are the following: *Challenger* stations, 44, west of our own coast, latitude 37° 25′ N.; longitude 71° 40′ W., depth, 1,700 fathoms (3,109 meters); bottom temperature, 36.2° F. (2.3° C.); station 85, off the Canary Islands, latitude 28° 42′ N., longitude 18° 06′ W., depth, 1,125 fathoms (2,057 meters); station 348, off the coast of Africa, just north of the equator, latitude 3° 10′ N., longitude 14° 51′ W., depth, 2,450 fathoms (4,480 meters), and station 325, South Atlantic, east of Buenos Aires, 1,900 fathoms (3,475 meters), bottom temperature 32° F. (0° C.). Pearcey records it as rare from one *Scotia* station in the Antarctic, 420, latitude 69° 33′ S., longitude 15° 19′ W., in 2,620 fathoms (4,791 meters).

In the *Albatross* material I have found it but once—from D2150, in the western Caribbean, off Central America, in 382 fathoms, (699 meters). This specimen is typical, branching, with very elongate cylindrical branches, the walls thin and firm, with some sponge spicules embedded in the exterior. The specimen measures nearly 7 mm. in length.

Brady's figures in the *Challenger* Report show the interior walls dividing the chambers from one another.

Aschemonella ramuliformis—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
10642	U.S.N.M.	1	D2150...	° ′ ″ ° ′ ″ 13 34 45 N.; 81 21 10 W..	382	°F. 45.75	wh. crs. s....	Rare.

ASCHEMONELLA CATENATA (Norman).

Plate 1, figs. 2–4.

Astrorhiza catenata Norman, Proc. Roy. Soc., vol. 25, 1876, p. 213.

Aschemonella catenata H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 42, pl. 4, figs. 12, 13; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 271, pl. 27, figs. 1–11; pl. 27 A, figs. 1–3.—Millett, Journ. Roy. Micr. Soc., 1899, p. 252, pl. 4, figs. 5, 6.—Chapman, The Foraminifera, 1902, p. 126, pl. 6, fig. 1.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 81, fig. 111–113.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1005.

Aschemonella scabra H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 44, pl. 3, figs. 6, 7.

Description.—"Test free, irregularly branched; chambers numerous, inflated, variable in size and contour, usually with several tubulated orifices, each of which may produce a fresh segment. Walls thin,

compactly built, exterior more or less rough, often acerose, with partially embedded sponge-spicules; interior smooth. Complete specimens sometimes $\frac{5}{12}$ inch (10.5 mm.) in length."

Distribution.—Norman originally described this species from material dredged at the entrance to Davis Strait. From the *Challenger* records there are seven Atlantic stations for this species, as follows: Station 5, latitude 24° 20′ N.; longitude 24° 28′ W., 2,740 fathoms (5,011 meters); station 23, latitude 18° 26′ N.; longitude 63° 29′ W., 450 fathoms (823 meters); station 24, latitude 18° 38′ 30″ N.; longitude 65° 05′ 30″ W., 390 fathoms (713 meters); station 85, latitude 28° 42′ N.; longitude 18° 06′ W., 1,125 fathoms (2,057 meters); station 98, latitude 9° 21′ N.; longitude 18° 28′ W., 1,750 fathoms (3,200 meters); station 120, latitude 8° 37′ S.; longitude 34° 28′ W., 675 fathoms (1,234 meters); station 323, latitude 35° 39′ N.; longitude 50° 47′ W., 1,900 fathoms (3,475 meters).

Pearcey recorded this with the preceding species from *Scotia* station 420 from the Antarctic, latitude 69° 33′ S.; longitude 15° 19′ W., in 2,620 fathoms (4,791 meters).

In the *Albatross* material it has occurred on the eastern coast of the United States from latitude 40° southward and at one station in the western part of the Caribbean. These *Albatross* stations range in depth from 399 to 2,045 fathoms (730 to 3,740 meters) and the bottom temperatures from 36.8 to 39.1° F. (2.6 to 3.8° C.).

Most of the material from the Atlantic coast is very irregular in contour and most closely resembles Brady's plate 27, figures 5–8, with numerous stolon-like processes. In this connection it should be noted that the complete specimens figured by Brady, *Challenger* Report, plate 27A, figures 1–3, are, if the magnification is correctly given, about the size of a single chamber of the form I have seen and that figured by Brady on plate 27.

The various forms of the chambers given would indicate a primitive organism which has not acquired a fixity of shape for its test, but gives off numerous apertures and new chambers at various places. Such indications seem to confirm the idea of placing this genus in a subfamily by itself as the most primitive of the several chambered forms included in the Lituolidae.

The color in the specimens I have had has invariably been a light gray. The walls are very thin, but are firmly cemented.

The species is known from both the North and South Pacific, and Millett has recorded rounded specimens from the Malay Archipelago. The various forms from different areas would suggest that more than one species or variety may be present with corresponding limitations of distribution, but specimens are never numerous at any of the stations from which I have had material.

Aschemonella catenata—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10137	U.S.N.M.	1	D2038...	38 30 30 N.; 69 08 35 W..	2,033	.....	glob. oz.....	Rare.
10138	U.S.N.M.	1	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Rare.
10139	U.S.N.M.	1	D2201...	39 30 30 N.; 71 41 30 W..	728	39.1	br. m.....	Rare.
10140	U.S.N.M.	4	D2226...	37 00 00 N.; 71 54 00 W..	2,045	36.8	glob. oz.....	Few.
10141	U.S.N.M.	1	D2234...	39 09 00 N.; 72 03 15 W..	810	38.6	gn. m.....	Rare.
10142	U.S.N.M.	2	D2355...	20 56 48 N.; 86 27 00 W..	399	.....	yl. oz.....	Rare.
10143	U.S.N.M.	1	D2531...	40 42 00 N.; 66 33 00 W..	852	38.4	gy. m.....	Rare.
10144	U.S.N.M.	1	D2678...	32 40 00 N.; 76 40 30 W..	731	38.7	lt. gy. oz....	Rare.

Subfamily 2. REOPHACINAE.

Test composed of agglutinated material, sand grains, sponge spicules, tests of other foraminifera, etc., with a varying amount of cement, chambers in a linear series, aperture usually single and at the distal end of the chamber but occasionally at the side, rarely multiple or cribrate.

This subfamily includes numerous species of *Reophax*, *Hormosina*, and *Haplostiche*. The chambers vary in relative size and position, usually being in a straight series but occasionally being oblique or irregularly curved, either overlapping strongly or on the other extreme remotely placed with long tubular connections between the chambers. There seems to be some selective power in various species, sand grains, sponge spicules, and other foraminiferal tests being used while in one deep water species, *Reophax membranaceous* the test is largely chitinous, thin, and nearly transparent.

Genus REOPHAX Montfort, 1808.

Reophax MONTFORT (type, *R. scorpiurus* Montfort), Conch. Syst., vol. 1, 1808, p. 330, 83me genre.—H. B. BRADY (part), Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 289.—EIMER and FICKERT, Zeitschr. Wiss. Zool., vol. 65, 1899, p. 675.—CHAPMAN, The Foraminifera, 1902, p. 137.—CUSHMAN, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 82.

Nodosaria D'ORBIGNY (not of Lamarck), 1812 (part), Ann. Sci. Nat., vol. 7, 1826, p. 255.—TERQUEM, Mem. Acad. Imp. Metz, vol. 51, 1870, p. 354.

Lituola PARKER and JONES (part), Philos. Trans., vol. 155, 1865, p. 407.—PARKER, Can. Nat., vol. 5, 1870, pp. 177, 180.—PARKER, JONES, and H. B. BRADY, Ann. Mag. Nat. Hist., ser. 4, vol. 8, 1871, p. 159.—SIDDALL, Proc. Chester Soc. Nat. Sci., pt. 2, 1878, p. 47.—BÜTSCHLI, in Bronn, Klassen und Ordnungen des Thierreichs, vol. 1, 1880, p. 192.

Haplostiche SCHWAGER (not of Reuss, 1861), Jahr. Ver. Vet. Nat. Württemburg, vol. 21, 1865, p. 92.

Nodulina RHUMBLER, Nachr. Kön. Ges. Wiss. Göttingen, 1895, p. 85.

Description.—Test free, composed of chambers in a linear series, usually joined end to end in a straight or slightly curved line, ranging from closely overlapping chambers to remotely separated ones with stoloniferous connections between, chambers few or numerous, wall

of sand grains, mica scales, sponge spicules, chitinous or of tests of other foraminifera; chambers undivided, aperture simple, terminal, at the distal end of the last-formed chamber.

The genus by some authors is allowed to include the single chambered forms which are here included in the family Astrorhizidae under the genus *Proteonina* Williamson. As here used it includes only the multiple chambered species with undivided chambers and single oral aperture.

REOPHAX SCORPIURUS Montfort.

Plate 1, figs. 5–7.

"*Orthoceras*"?, Soldani, Testaceographica, vol. 1, 1795, p. 239, pl. 162, fig. K.

Reophax scorpiurus Montfort, Conch. Syst., vol. 1, 1808, p. 330, 83me genre.—W. B. Carpenter, The Microscope, ed. 6, 1881, p. 564, fig. 321*e*.—H. B. Brady, Denkschr. Akad. Wiss. Wien, vol. 42, 1881, p. 99.—Haeusler, Quart. Journ. Geol. Soc., vol. 39, 1883, p. 27, pl. 2, fig. 7.—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 291, pl. 30, figs. 12, 15–17 (not 13, 14).—Balkwill and Wright, Trans. Roy. Irish Acad., vol. 28, 1885, p. 328, pl. 13, figs. 5*a*, *b*.—Haeusler, Neues Jahrb. für. Min., Beil., vol. 4, 1885, p. 9, pl. 1, figs. 9–16.—A. Agassiz, Bull. Mus. Comp. Zoöl., vol. 15, 1888, p. 163, fig. 495 (in text).—H. B. Brady, Parker, and Jones, Trans. Zool. Soc., vol. 12, 1888, p. 217, pl. 41, fig. 10 [?].—Haeusler, Abh. Schweiz. Pal. Ges., vol. 17, 1890, p. 27, pl. 5, figs. 23–34.—J. Wright, Proc. Roy. Irish Acad., vol. 1, 1891, p. 467.—Chapman, Journ. Roy. Micr. Soc., 1892, p. 320, pl. 5, figs. 4, 5.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 257, pl. 4, fig. 18; pl. 5, figs. 45, 46.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 24, pl. 5, figs. 158–163; pl. 6, figs. 164–167 (not 168–171).—Chapman, Proc. Zool. Soc. London, 1895, p. 14.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 26.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 273, pl. 16, fig. 3.—Millett, Journ. Roy. Micr. Soc., 1899, p. 254.—Guppy, Proc. Inst. Trinidad, vol. 2, 1902, p. 3, pl. 2, fig. 2.—Chapman, The Foraminifera, 1902, p. 137, pl. 7, fig. B; Trans. and Proc. New Zealand Inst., vol. 38, 1906, p. 84.—Bagg, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 126.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 83, figs. 114–116.—Awerinzew, Mem. Acad. Imp. Sci. St. Petersbourg, ser. 8, vol. 29, No. 3, 1911, p. 15.—Rhumbler, Foram. Plankton Exped., teil. 1, 1911, pl. 8, figs. 2–5; teil. 2, 1913, p. 470.—Heron-Allen and Earland, Proc. Roy. Irish Acad., vol. 31, No. 64, 1913, p. 43.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1006.—Chapman, Zool. Results "Endeavour," 1915, p. 311.—Heron-Allen and Earland, Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 222.—Cushman, Proc. U. S. Nat. Mus., vol. 56, 1919, p. 598.

Nodosaria (*Dentalina*) *scorpionus* d'Orbigny, Ann. Sci. Nat., vol. 7, 1826, p. 255, No. 40.

Lituola scorpiurus H. B. Brady, Trans. Linn. Soc. London, vol. 24, 1864, p. 467, pl. 48, fig. 5; Nat. Hist. Trans. Northumberland, vol. 1, 1867, p. 96, pl. 12, fig. 3.—Dawson, Can. Nat., vol. 5, 1870, p. 177, fig. 4.—Parker, Jones, and H. B. Brady, Ann. Mag. Nat. Hist., ser. 4, vol. 8, 1871, p. 159, pl. 9, fig. 29.—Dawson, Amer. Journ. Sci., vol. 1, 1871, p. 206, fig. 4; Ann. Mag. Nat. Hist., ser. 4, vol. 7, 1871, p. 86, fig. 4.

Lituola nautiloida, var. *scorpiurus* Parker and Jones, Philos. Trans., 1865, p. 407, pl. 15, fig. 48*a*, *b*.—H. B. Brady, Pal. Soc. Mon., vol. 30, 1876, p. 63, pl. 8, fig. 7.—Schwager, Boll. Reg. Com. Geol. Ital., vol. 8, 1877, p. 26, fig. 87.—Bütschli, in Bronn, Klassen und Ordnungen des Thierreichs, vol. 1, 1880, p. 192, pl. 5, fig. 18.

Description.—Test consisting of a number of chambers, rapidly increasing in size as added, early chambers more or less indistinct, irregularly arcuate, later ones larger and more distinct, nearly in a straight line; walls of coarse sand grains, rather roughly cemented, surface rough; aperture simple, small, with a short neck.

Length up to 2 mm.

Distribution.—The published records for this species cover most parts of the world from which foraminifera have been recorded, and it is a relief occasionally to find papers like the recent ones of Chapman's on the Foraminifera of the Antarctic Expedition which do not record it. As noted in an earlier paper,[1] the original figures and later poor copies, together with the series given by Brady, have led to a habit of putting under this name all sorts of things which did not seem to fit well elsewhere. That there is a very fairly well-defined species to which the name can be applied has been apparent from a study of the *Albatross* Atlantic material. No material was, however, found in the Gulf of Mexico. The Goës material from D2355 off Yucatan is typical of the more tropical material referred to this species, and even this seems different from the species in cold water in both form, size, and general appearance. In his set of mounted material from this station Goës also included specimens which are *R. bilocularis* Flint.

A have seen typical specimens also in *Goldseeker* material from north of the British Isles.

Reophax scorpiurus—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10190	U.S.N.M.	1	D2052.....	39 40 05 N.; 69 21 25 W..	1,098	45	glob. oz.....	Rare.
10191	U.S.N.M.	1	D2093.....	39 42 50 N.; 71 01 20 W..	1,000	39	for. S. M....	Rare.
10192	U.S.N.M.	2	D2097.....	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Rare.
10193	U.S.N.M.	4	D2111.....	35 09 50 N.; 74 57 40 W..	938	.....	gn. m.....	Few.
10194	U.S.N.M.	1	D2150.....	13 34 45 N.; 81 21 10 W..	382	45.75	wh. crs. s...	Rare.
10524	U.S.N.M.	4	D2231.....	38 29 00 N.; 73 09 00 W..	965	36.8	gy. oz.....	Few.
10195	U.S.N.M.	1	D2313.....	32 53 00 N.; 77 53 00 W..	99	57.2	crs. s. bk. sp. brk. sh.	Rare.
10196	U.S.N.M.	6	D2531.....	40 42 00 N.; 66 33 00 W..	852	38.4	gy. m.....	Frequent.
10197	U.S.N.M.	2	H80.....	13 56 35 N.; 63 02 00 W..	684	.....	gy. m. for...	Rare.
10198	U.S.N.M.	7	*Goldseeker.*	61 03 00 N.; 2 20 00 W..	875	.....	.....	Frequent.

REOPHAX PILULIFER H. B. Brady.

Plate 2, fig. 1.

Reophax pilulifer H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 292, pl. 30, figs. 18–20.—H. B. Brady, Parker, and Jones, Trans. Zool. Soc. London, vol. 12, pt. 7, 1888, p. 217, pl. 41, figs. 5–8(?).—Chapman, Proc. Zool. Soc. London, 1895, p. 15.—Goës, Bull. Mus.Comp. Zoöl., vol. 29, 1896, p. 27.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 273, pl. 18, fig. 1.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 85, figs. 117, 118.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1014, p. 1007.

[1] Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 85

Description.—Test composed of a few (3–5) subglobose chambers in a straight or more commonly curved line, each as added much larger than the preceding; wall of coarse sand grains with a rather neat exterior, apertural end with a slight protuberance and a smaller aperture; color reddish or yellowish brown or gray.

Length up to 2.5 mm.

Distribution.—Brady had this species from five *Porcupine* stations in the North Atlantic west and southwest of Ireland and from a few *Challenger* stations in deep water, off the eastern coast of the United States, near the Azores. northeast of Puerto Rico, off the coast of South America, off Brazil and Buenos Aires, off the coast of Africa, and off the Cape of Good Hope.

Pearcey records it from several stations in the Antarctic; Brady, Parker, and Jones record it from the Abrohlos Bank off Brazil, but their figured material does not seem to belong to this species. It is also known from various parts of the Pacific (Brady, Goës, Cushman).

I have seen a set of this species from *Porcupine* station 19, selected by W. B. Carpenter and now in the United States National Museum. This shows a short, but large, robust species entirely unlike anything found on our coast, so far as I have seen material. A smaller form which in general resembles this was found at five stations to the northeastward of that recorded in the *Challenger* Summary of Results, station 44, and two *Albatross* stations in the northern part of the Gulf of Mexico. Flint's material was from *Albatross* D2760, off Bahia, Brazil, in 1,019 fathoms (1,864 meters).

Reophax pilulifer—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10183	U.S.N.M.	1	D2038...	38 30 30 N.; 69 08 35 W..	2,033	.....	glob. oz.....	Rare.
10184	U.S.N.M.	10	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Common.
10185	U.S.N.M.	1	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Rare.
10186	U.S.N.M.	4	D2377...	27 07 30 N.; 88 08 00 W..	210	67	gy. m.....	Few.
10187	U.S.N.M.	1	D2394...	28 38 30 N.; 87 02 00 W..	420	41.8	gy. m.....	Rare.
10188	U.S.N.M.	3	D2768...	39 15 00 N.; 68 08 00 W..	1,781	36.9	gy. oz.....	Few.
10189	U.S.N.M.	1	D2572...	40 29 00 N.; 66 04 00 W..	1,769	37.8	gy. oz.....	Rare.
6267	U.S.N.M.	10+	*Porcupine.* 19.	54 53 00 N.; 10 56 00 W..	1,360	37.4	glob. oz.....	Common.

REOPHAX CURTUS, new species.

Plate 2, figs. 2, 3.

Reophax scorpiurus Goës (part) (not *R. scorpiurus* Montfort), Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 24, pl. 5, figs. 160–163.

Description.—Test short and thick, composed typically of three chambers, increasing rapidly in size as added, last-formed chamber making up a large proportion of the test, fusiform or elliptic, axis of

the test straight or more often slightly curved; wall composed of angular quartz sand grains with a considerable amount of gray cement between; apertural end slightly tapering, without a definite neck, the aperture being an opening between three or more sand grains at the end of the chamber.

Length up to 2 mm.

Distribution.—Type specimen (U.S.N.M. No. 10669) from *Albatross* station D2458 in 89 fathoms (163 meters) north of the Grand Banks. At this station such specimens were common. It also occurred at one station off our southern Atlantic coast, and I have specimens from comparatively shallow water in Passamaquoddy Bay, Maine.

The species is shorter, thicker, and fewer chambered than *R. scorpiurus*, the chambers fewer and longer than in *R. pilulifer* and different in the material of the wall and in the number and shape of the chambers from *R. bilocularis*.

It seems to be a species of cold waters and moderate depths.

Goës figures this species under the name of *R. scorpiurus* in the reference noted above. The specimens were from the Greenland Sea in 35–215 meters and from the Skagerack in 250 meters.

Reophax curtus—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10668	U.S.N.M.	3	D2425...	36 20 24 N.; 74 46 30 W..	119	51.5	dk. gy. m. fne. s.	Few.
10669	U.S.N.M.	10+	D2458...	46 48 30 N.; 52 34 00 W..	89	29.5	s. gn. m.....	Common.

REOPHAX AGGLUTINATUS Cushman.

Plate 2, figs. 4, 5.

Reophax scorpiurus H. B. Brady (part) (not *R. scorpiurus* Montfort), Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, pl. 30, fig. 13.

Reophax agglutinatus Cushman, Proc. U. S. Nat. Mus., vol. 44, 1913, p. 637, pl. 79, fig. 6.

Description.—Test elongate, tapering, widest near the apertural end, composed of a few chambers (4–6), subglobular or elliptical, wall made of other foraminiferal tests, usually *Globigerina*, firmly cemented by a yellowish gray cement, apertural end truncate with a small aperture without a definite neck.

Length up to 4 mm.

Distribution.—Typical specimens from station D2550 off the northeastern coast of the United States in 1,081 fathoms (1,977 meters). It has also occurred at other stations in the same region and was probably present but not recorded from still others.

It differs in its wall and cement from typical *R. scorpiurus* the yellowish gray cement being peculiar. This species was first described from the Philippines but is apparently widely distributed.

Reophax agglutinatus—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10665	U.S.N.M.	1	D2228...	37 25 00 N.; 73 06 00 W..	1,582	36.8	br. m.....	Rare.
10666	U.S.N.M.	2	D2531...	40 42 00 N.; 66 33 00 W..	852	38.4	gy. m.....	Rare.
10667	U.S.N.M.	2	D2550...	39 44 30 N.; 70 30 45 W..	1,081	38.5	br. m.....	Rare.

REOPHAX AGGLUTINATUS Cushman, var. GLOMERATUS, new variety.

Plate 2, fig. 6; plate 3, figs. 1, 2.

Description.—Variety differing from the typical in the larger size, the very distinct globular chambers rapidly increasing in size; interior smooth, chambers in a straight or much-curved line.

Length up to 10 mm.; diameter of largest chamber, 4.5 mm.

Distribution.—Type specimen (U.S.N.M. No. 10656) from D2043 off the northeastern coast of the United States in 1,467 fathoms (2,683 meters). At this station it is abundant and occurs at five other stations in the same general region.

This is a much larger form than the typical, and in the globular chambers and rapidly increasing size is distinct. So far as the material shows, it is closely limited to this area between latitude 38° 20′ N. and 40° 09′ N. and longitude 67° 09′ W. and 70° 57′ W. The average depth is over 1,500 fathoms (2,743 meters). This may be specifically distinct from *R. agglutinatus*, but until more is known of the distribution of the two I prefer to leave it as a variety.

Reophax agglutinatus, var. glomeratus—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10655	U.S.N.M.	1	D2035...	39 26 16 N.; 70 02 37 W..	1,362	.....	glob. oz.....	Rare.
10656	U.S.N.M.	10+	D2043...	39 49 00 N.; 68 28 30 W..	1,467	38.5	glob. oz.....	Abundant.
10657	U.S.N.M.	2	D2221...	39 05 30 N.; 70 44 30 W..	1,525	36.9	gy. oz.....	Few.
10658	U.S.N.M.	3	D2571...	40 09 30 N.; 67 09 00 W..	1,356	37.8	gy. glob. oz .	Few.
10659	U.S.N.M.	1	D2713...	38 20 00 N.; 70 08 30 W..	1,859	.....	br. oz.....	Rare.
10660	U.S.N.M.	3	D2716...	38 29 30 N.; 70 57 00 W..	1,631	.....	br. oz. for...	Few.

REOPHAX BILOCULARIS Flint.

Plate 3, figs. 3, 4.

Reophax bilocularis Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 273, pl 17, fig. 2.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 90, fig. 127*a*, *b*.

Description.—Test composed of two chambers, each longer than broad and set in a straight line or at an angle, ends rounded, somewhat constricted between; walls of various material, most commonly of

tests of other foraminifera, surface more or less irregular, interior fairly smooth, with a yellowish brown cement; aperture at the end of a short tubular neck.

Length up to 2.5 mm.

Distribution.—The type station from which Flint described this species is *Albatross* D2679, off Cape Fear. At this station it is very common. It has occurred somewhat farther northeastward and in the Gulf of Mexico, but nowhere in such numbers as at the type station.

Occasional specimens at the type station show traces of a very small third chamber of the same shape as in ordinary specimens, but the two-chambered specimens are the rule in the great majority of cases. From other specimens that I have seen this seems to have a rather wide distribution, occurring in some numbers in the western Pacific. I recorded the species in the North Pacific just north of Guam.

This may be one of those Indo-Pacific species which reaches eastward into the Gulf of Mexico and adjacent portions of the western Atlantic

Reophax bilocularis—material examined.

Cat. No.	Coll. of—	No. of speci-mens.	Station.	Locality.	Depth in fath-oms.	Bot-tom tem-pera-ture.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10132	U.S.N.M.	2	D2115...	35 49 30 N.; 74 34 45 W..	843	39	m. fne. s....	Few.
10133	U.S.N.M.	3	D2377...	29 07 30 N.; 88 08 00 W..	210	67	gy. m.....	Few.
10134	U.S.N.M.	2	D2678...	32 40 00 N.; 76 40 30 W..	731	38.7	lt. gy. oz....	Few.
10135	U.S.N.M.	10+	D2679...	32 40 00 N.; 76 40 30 W..	782	38.6	lt. gy. oz....	Common.
10136	U.S.N.M.	1	D2682...	39 38 00 N.; 70 22 00 W..	1,004	.....	gn. m. s.....	Rare.

REOPHAX SCOTTII Chaster.

Reophax nodulosa(?) Scott, 8th Ann. Rep't Fisheries Board of Scotland, pt. 3, 1890, p. 314.

Reophax scottii Chaster, First Rep't Southport Soc. Nat. Sci., 1890-91, (1892), p. 57, pl. 1, fig. 1.—Millett, Journ. Roy. Micr. Soc., 1899, p. 255, pl. 4, fig. 13.—Sidebottom, Mem. Proc. Manchester Lit. and Philos. Soc., vol. 49, No. 5, 1905, p. 2; vol. 54, pt. 3, No. 16, 1910, p. 8.—Heron-Allen and Earland, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 44; Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 222.

Description.—Test elongate, somewhat compressed, chambers well separated; walls composed of minute flakes of mica attached to a chitinous membrane, whole test flexible when moist, but very fragile when dry.

Distribution.—This species seems to be a common one about the British Isles in comparatively shallow water on muddy bottoms. Heron-Allen and Earland record it from 10 stations in the Clare

Island region off western Ireland and from 5 stations off the west coast of Scotland. It is known from other stations in the same general region.

Millett records and figures a very slender specimen from the Malay Archipelago under this name, but it seems much more slender and as far as the figure shows has a different structure of the wall, but is recorded as flexible.

A single specimen from station D2003, latitude 37° 16′ 30″ N.; longitude 74° 20′ 36″ W., in 641 fathoms (1,172 meters), is composed largely of mica plates, but has not the other characters of this species.

REOPHAX DISTANS H. B. Brady.

Plate 3, figs. 5, 6.

Reophax distans H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 50; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 296, pl. 31, figs. 18–22.—Chapman, Proc. Zool. Soc. London, 1895, p. 15.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 27.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 85, fig. 119.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1007.

Description.—Test composed of a few elongate fusiform chambers with slender connecting tubular necks in a straight or irregular line; usually not more than three found attached; wall of sand grains neatly cemented, thin, color reddish brown or gray; apertural end with a tubular neck; aperture circular.

Length of three chambered specimens 5 mm.

Distribution.—The records show that this species is largely confined to deep cold waters. In such situations it is very widely distributed but never very common.

In the Atlantic Brady records it from the Faroe Channel, 355 fathoms (649 meters); off the west coast of Africa in 1,750 fathoms (3,200 meters) and off Buenos Aires in 1,900 fathoms (3,475 meters). Pearcey records it from *Scotia* station 459, latitude 41° 30′ S.; longitude 9° 55′ W., in 1,998 fathoms (3,654 meters). Neither Goës nor Flint recorded it in the Atlantic material of the *Albatross*. The only stations from which I have had it are given below, all between 37° and 40° N. latitude and between 68° and 72° W. longitude in deep cold water. Enough specimens were found at each of these stations to show that its absence elsewhere was not due to cursory examination.

Outside the Atlantic it has been noted in the North and South Pacific and in the Southern Ocean south of Africa and south of Australia. Chapman records it from the Arabian Sea.

It is a very well defined species but is not found whole as the slender stolon-like connections form a point of weakness causing breakage under a slight strain. Two varieties with different distribution are given below.

Reophax distans—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10108	U.S.N.M.	3	D2038	38 30 30 N.; 69 08 35 W.	2,033	.....	glob. oz.	Few.
10109	U.S.N.M.	9	D2039	38 19 26 N.; 68 20 20 W.	2,369	.....	glob. oz.	Few.
10110	U.S.N.M.	6	D2097	37 56 20 N.; 70 57 30 W.	1,917	.....	glob. oz.	Few.
10111	U.S.N.M.	3	D2226	37 00 00 N.; 71 54 00 W.	2,045	36.8	glob. oz.	Few.
10116	U.S.N.M.	10	D2568	39 15 00 N.; 68 08 00 W.	1,781	36.9	gy. oz.	Few.

REOPHAX DISTANS H. B. Brady, var. TURBO Goës.

Plate 4, fig. 1.

Reophax turbo Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 29, pl. 1, figs. 2, 3.

Description.—"Chambers conical trochiform, marginated, the margin on one side somewhat crenulated, the necks slender. One-chambered specimens only open at their two ends have been met with; test thin, firmly constructed of finest sand; surface nearly smooth."

Distribution.—Goës described this variety from two *Albatross* stations in the Gulf of Mexico D2394, latitude 28° 38′ 30″ N.; longitude 87° 02′ W. in 420 fathoms (768 meters) and D2395, latitude 28° 36′ N.; longitude 86° 50′ W., in 347 fathoms (635 meters). I have found a single specimen from the first of these two stations and have examined Goës' type material from the same station.

Although single chambers only have been met with it seems that these are broken from a series both ends showing fracture and are related to *R. distans*.

REOPHAX DISTANS H. B. Brady, var. DELICATULUS, new variety.

Plate 4, fig. 2.

Description.—Chambers subglobular instead of elongate fusiform somewhat longer than wide, the ends broadly rounded, of fine sand, dark reddish brown in color, the tubular connections very slender and not enlarging where they connect with the chambers.

Distribution.—Type specimen from *Albatross* station D2393, U.S.N.M No. 10114. The three stations in the Gulf of Mexico at which this variety was found are close together. In Goës' collection it appears from station D2379 in the same area under the name *Hormosina globulifera*? Brady.

REOPHAX GUTTIFER H. B. Brady.

Plate 3, fig. 7.

Reophax guttifer H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 49; Proc. Roy. Soc. Edinburgh, vol. 11, 1882, p. 711; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 295, pl. 31, figs. 10–15.—J. Wright, Proc. Roy. Irish Acad., ser. 3, vol. 1, 1891, p. 467.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 26, pl. 6, figs. 192-195.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 88, fig. 123.—Rhumbler, Foram. Plankton Exped., teil 1, 1911, pl. 8, figs. 13–19; teil 2, 1913, p. 472.

Description.—Test elongate, usually straight, composed of several (3–8) chambers usually in a straight line, the earlier ones especially, pyriform with a truncate base, well separated from one another by the slender necks, anterior end tapering; wall of rather coarse sand grains firmly cemented but with a rough exterior; aperture circular at the end of a short cylindrical tapering neck; color yellowish brown.

Length up to 1.6 mm.

Distribution.—Brady records this species from the Faroe Channel in 540 fathoms (987 meters) and from three *Challenger* stations in mid-Atlantic, west of the Azores 1,675 fathoms (3,063 meters), a single doubtful specimen off Palma, Canaries, 1,125 fathoms (2,057 meters) and very typical material from the South Atlantic east of Buenos Aires in 1,900 fathoms (3,475 meters). Goës records it from Spitzbergen.

In the *Albatross* dredgings I have had material from seven stations off the northeastern coast of the United States between latitude 37° and 40° N., and longitude 69° and 74° W. The material from two of these stations is very fine but is small and resembles very closely the figures given by Goës from off Spitzbergen. Except at one station the species is very rare.

It is also known from the North Pacific in deep water.

Reophax guttifer—material examined.

Cat. No.	Coll. of—	No. of specimens	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10199	U.S.N.M.	2	D2003...	37 16 30 N.; 74 20 36 W..	641	.....	.....	Rare.
10200	U.S.N.M.	2	D2037...	38 53 00 N.; 69 23 30 W..	1,731	38	glob. oz.....	Rare.
10201	U.S.N.M.	1	D2038...	38 30 30 N.; 69 08 35 W..	2,033	.....	glob. oz.....	Rare.
10202	U.S.N.M.	1	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Rare.
10203	U.S.N.M.	1	D2212...	39 59 30 N.; 70 30 45 W..	428	40	gn. m.....	Rare.
10204	U.S.N.M.	1	D2243...	40 10 15 N.; 70 26 00 W..	63	52.4	gn. m.....	Rare.
10205	U.S.N.M.	9	D2262...	39 54 45 N.; 69 29 45 W..	250	41.6	gn. m. s.....	Few.

REOPHAX GUTTIFER H. B. Brady, var. SPICULILEGA Rhumbler.

Reophax guttifera H. B. Brady, var. *spiculilega* Rhumbler, Foram. Plankton Exped., teil 1, 1911, pl. 8, fig. 20; tiel 2, 1913, p. 473.

Description.—Differs from the type in the wall of the test which has numerous sponge spicules.

Rhumbler records but two specimens and these but end chambers. They were from near St. Vincent, Cape Verde Islands, in 659 fathoms (1,205 meters).

REOPHAX ROBUSTUS Pearcey, var. SEPTENTRIONALIS, new variety.

Plate 4, figs. 3–5.

Description.—Test large, of few chambers (3–4), each nearly spherical and much larger than the preceding, wall very firmly cemented, of coarse angular sand grains, surface roughened by large angular fragments attached to the exterior; chambers distinct, sutures de-

pressed, apertural end without a definite tubular neck; color grayish brown.

Length up to 7 mm.

Distribution.—Type specimen (U.S.N.M. No. 10663) from D2572 off the Georges Banks. It also occurred in this same region at two other stations.

The species described by Pearcey from the Antarctic is similar to this in general characters but all the specimens of this northern variety lack the definite tubular neck and the coloration noted in the species.

Pearcey records the species from *Scotia* station 420 in 2,620 fathoms (4,791 meters) as abundant but not found elsewhere.

Reophax robustus, var. septentrionalis—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10662	U.S.N.M.	1	D2084...	40 16 50 N.; 67 05 15 W..	1,230	40	bu. m. & s...	Rare.
10663	U.S.N.M.	2	D2572...	40 29 00 N.; 66 04 00 W..	1,769	37.8	gy. oz.....	Rare.
10664	U.S.N.M.	1	D2706...	41 28 30 N.; 65 35 30 W..	1,188	.....	gy. oz. for...	Rare.

REOPHAX ADUNCUS H. B. Brady.

Plate 5, fig. 1.

Reophax adunca H. B. Brady, Proc. Roy. Soc. Edinburgh, vol. 11, 1882, p. 715; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 296, pl. 31, figs. 23-26.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 274, pl. 18, fig. 5.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 89, fig. 125.—Chapman, Journ. Linn. Soc. Zoology, vol. 30, 1910, p. 400.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1005.

Description.—Test composed of several subglobular, pyriform or slightly compressed chambers arranged in a linear series but not usually in a straight line, more often being somewhat irregular, constrictions between the chambers usually deep, walls thin, composed of sand grains forming a roughened surface; color gray, yellowish or reddish brown.

Length 2.5 mm. or more.

Distribution.—The *Challenger* Atlantic records for this species are station 78, south of the Azores, latitude 37° 26′ N.; longitude 25° 13′ W., in 1,000 fathoms (1,829 meters); station 85 off the Canaries, latitude 28° 42′ N.; longitude 18° 06′ W.; depth 1,125 fathoms (2,057 meters); station 120 off Brazil, latitude 8° 37′ S.; longitude 34° 28′ W., in 675 fathoms (1,234 meters); station 323 east of Buenos Aires, latitude 35° 39′ S.; longitude 50° 47′ W., in 1,900 fathoms (3,475 meters) and station 332 in the South Atlantic, latitude 37° 29′ S.;

longitude 27° 31′ W., in 2,200 fathoms (4,023 meters). Besides these it is recorded by Brady from the Faroe Channel in 540 fathoms (988 meters). Flint recorded it from two stations, one of which, D2338, latitude 23° 10′ N.; longitude 82° 20′ W., depth 189 fathoms (346 meters) in the Gulf of Mexico west of Cuba I have had no material from but have from a near-by station. The *Scotia* obtained it at station 420, latitude 69° 33′ S.; longitude 15° 19′ W., 2,620 fathoms (4,791 meters) in the Antarctic recorded by Pearcey.

In the *Albatross* material, I have had the species from 19 stations, ranging in depth from 167–2,369 fathoms (305–4,332 meters) and bottom temperatures 36.8°–40.1° F. (2.6–4.4° C.), with one station 45° F. (7.2° C.) These are mostly from the region south of Georges Banks and westward but a few continue down the coast and three are in the Gulf of Mexico.

Nearly all of the specimens here included are typical.

This seems to be a primitive species in its lack of fixity of character, the line of direction of attachment of the chambers being often very irregular and the shape of the chambers not uniform or regular. As many as eight chambers are present in some of the specimens but the average is much less. The weakness of the connection of the chambers seems to be the main reason for the small number and the irregularity of the line making the test more easily broken. Chambers are either pyriform or subglobular but are very often somewhat compressd and the connections are not as a rule exactly median but more often in an excentric position. The size of the chambers varies but slightly in most cases. The three figures in the middle of the five of Flint are very typical.

Reophax aduncus—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10264	U.S.N.M.	1	D2036	38 52 40 N.; 69 24 40 W.	1,735	38	glob. oz	Rare.
10091	U.S.N.M.	1	D2039	38 19 26 N.; 68 20 20 W.	2,369	.....	glob. oz	Rare.
10092	U.S.N.M.	1	D2041	39 22 50 N.; 68 25 00 W.	1,608	38	glob. oz	Rare.
10106	U.S.N.M.	1	D2042	39 33 00 N.; 68 26 45 W.	1,555	38.5	glob. oz	Rare.
10093	U.S.N.M.	2	D2043	39 49 00 N.; 68 28 30 W.	1,467	38.5	glob. oz	Rare.
10521	U.S.N.M.	1	D2052	39 40 05 N.; 69 21 25 W.	1,098	45	glob. oz	Rare.
10094	U.S.N.M.	1	D2110	35 12 10 N.; 74 57 15 W.	516	40	bu. m	Rare.
10107	U.S.N.M.	1	D2160	23 10 31 N.; 82 20 37 W.	167	.....	co	Rare.
10095	U.S.N.M.	1	D2202	39 38 00 N.; 71 39 45 W.	515	39.1	gn. m	Rare.
10096	U.S.N.M.	5	D2205	39 35 00 N.; 71 18 45 W.	1,073	38.1	gy. oz	Few.
10097	U.S.N.M.	4	D2212	39 59 30 N.; 70 30 45 W.	428	40	gn. m	Few.
10098	U.S.N.M.	4	D2221	39 05 30 N.; 70 44 30 W.	1,525	36.9	gy. oz	Few.
10099	U.S.N.M.	1	D2222	39 03 15 N.; 70 50 45 W.	1,537	36.9	gy. oz	Rare.
10100	U.S.N.M.	1	D2228	37 25 00 N.; 73 06 00 W.	1,582	36.8	br. m	Rare.
10101	U.S.N.M.	1	D2381	28 05 00 N.; 87 56 15 W.	1,330	.....	lt. br. m	Rare.
10102	U.S.N.M.	1	D2385	28 51 00 N.; 88 18 00 W.	730	40.1	gy. m	Rare.
10103	U.S.N.M.	4	D2550	39 44 30 N.; 70 30 45 W.	1,081	38.5	br. m	Few.
10104	U.S.N.M.	2	D2562	39 15 30 N.; 71 25 00 W.	1,434	37.3	gy. oz	Rare.
10105	U.S.N.M.	1	D2677	32 39 00 N.; 76 50 30 W.	478	39.3	gn. m	Rare.

REOPHAX NODULOSUS H. B. Brady.

Plate 5, figs. 2, 3.

Reophax nodulosus H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 52, pl. 4, figs. 7, 8; Denkschr. Akad. Wiss. Wien, vol. 42, 1881, p. 99; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 294, pl. 31, figs. 1–9.—Toutkowski, Zap. Kievsk. obshch. Est., vol. 9, 1888, p. 5, pl. 2, figs. 2*a*, *b*.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 256, pl. 4, figs. 5–7, 12, 13 (?).—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 26, pl. 6, figs. 187–191.—Chapman, Proc. Zool. Soc. London, 1895, p. 15.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 27.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 274, pl. 18, fig. 4.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 87, fig. 122.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1006.

Description.—Test elongate, tapering, straight or slightly curved, composed of several (up to 20) chambers, but usually less than 12, pyriform in shape, widest near the basal end and thence tapering toward the apertural end, chambers gradually increasing in length and diameter as added, wall in short chambered specimens rough, in those with elongate chambers usually neatly finished on the exterior, composed of sand grains with a reddish-brown cement; aperture fairly large, circular; color reddish or yellowish brown.

Length up to 25 mm.

Distribution.—From the available records this species is very widely distributed. In the published figures there is a wide range of form shown. From the *Albatross* material it has not been abundant except at a few stations in the Gulf of Mexico, but there are scattered specimens from other stations. From this material it seems worthy of note that different areas show rather constant differences in form and size. The very large specimens figured by Brady were obtained by the *Challenger* near the Antarctic ice barrier, and it is noteworthy that Pearcey also found specimens over an inch in length in the Antarctic material of the *Scotia*.

Although reaching such a splendid development in the Antarctic, there is no such corresponding development in the Arctic, where it is not even given as a characteristic species by Awerinzew or in other lists from this region, although mentioned by Brady as occurring off Franz Josef Land. Even in the comparatively meager material I have had there seems to be at least three distinct forms, with an indicated corresponding distribution. Except in the Gulf of Mexico and at one or two other stations, specimens are not abundant enough for a definite working out of the problem at the present time. In the deep water of the Philippine region from which I have had considerable material the form of the species is entirely different from that of the Atlantic and of the western Pacific, and altogether it is strongly indicated that there are several varieties and perhaps species included under this name.

These forms all agree in one important detail, that of the form of the apertural end of the chambers, which are tapering with straight sides and the end broadly truncate, giving a large aperture. The figures given by Goës show an entirely different form and I do not think belong to this species, even in a broad sense. Egger's figures are very greatly lacking in character, but none of them represent anything that seems to me to belong here.

Reophax nodulosus—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10117	U.S.N.M.	1	D2035...	39 26 16 N.; 70 02 37 W..	1,362	.....	glob. oz.....	Rare.
10118	U.S.N.M.	1	D2072...	41 53 00 N.; 65 35 00 W..	858	39.	gy. m.....	Rare.
10523	U.S.N.M.	1	D2140...	17 36 10 N.; 76 46 05 W..	966	39.7	s.....	Rare.
10119	U.S.N.M.	1	D2383...	28 32 00 N.; 88 06 00 W..	1,181	39.8	br. gn. m....	Rare.
10120	U.S.N.M.	6	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Few.
10121	U.S.N.M.	1	D2393...	28 43 00 N.; 87 14 30 W..	525	41.1	lt. gy. m....	Rare.
10122	U.S.N.M.	1	D2505...	44 23 30 N.; 61 44 15 W..	93	42.3	dk. br. m ...	Rare.
10123	U.S.N.M.	1	D2542...	40 00 15 N.; 70 42 20 W..	129	47.2	s. brk. sh....	Rare.
10124	U.S.N.M.	10+	D2568...	39 15 00 N.; 68 08 00 W..	1,781	36.9	gy. oz.....	Common.
10125	U.S.N.M.	1	H82.....	13 29 00 N.; 62 42 40 W..	1,051	.....	for.m. bk. sp.	Rare.
10126	U.S.N.M.	1	H86.....	12 58 40 N.; 62 48 00 W..	1,635	.....	bu. m. for. bk. sp.	Rare.
10145	U.S.N.M.	1	H88.....	12 29 00 N.; 62 38 30 W..	1,630	.....	m. bk. sp.for	Rare.

REOPHAX DENTALINIFORMIS H. B. Brady.

Plate 5, figs. 4, 5.

Reophax dentaliniformis H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 49; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 293, pl. 30, figs. 21, 22.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 25, pl. 6, figs. 172–175.—Schlumberger, Mem. Soc. Zool. France, vol. 7, 1894, p. 239.—Chapman, Proc. Zool. Soc. London, 1895, p. 15.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 27.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 274, pl. 18, fig. 2.—Millett, Journ. Roy. Micr. Soc., 1899, p. 254.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 87, fig. 121.—Awerinzew, Mem. Acad. Imp. Sci. St. Petersbourg, ser. 8, vol. 29, No. 3, 1911, p. 15.—Rhumbler, Foram. Plankton Exped., teil 1, 1911, pl. 8, figs. 21, 22; teil 2, 1913, p. 473.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1006.—Chapman, Zool. Results "Endeavour," vol. 1, pt. 3, 1915, p. 310.

Reophax nodulosa Bagg (not H. B. Brady), Proc. U. S. Nat. Mus., vol. 34, 1908, p. 23.

Description.—Test slender, tapering, composed of a few (5–6) chambers, increasing progressively in length as added, slightly tumid in the middle, contracted slightly at the ends; arranged in a straight or slightly curved line; wall of rather coarse sand grains but cemented to give a smooth even surface. apertural end tapering rather abruptly to a short cylindrical neck; aperture circular, color gray.

Length up to 2 mm.

Distribution.—This is a species of wide distribution unless as may be suspected more than one species has been included under this name. I have tried to restrict it to those rather small and delicate specimens with the tapering form and elongate last chamber figured by Brady. In

the *Albatross* dredgings such specimens have occurred at numerous stations along the eastern coast of the United States, a few in the Gulf of Mexico, and one off Brazil. The published records give its occurrence in the Arctic and Antarctic, off Australia, the Arabian Sea, the Malay region and the Sea of Okhotsk as well as other regions. If all these are typical it certainly has a very wide distribution. Unfortunately no figures are given in a majority of these cases and descriptive notes are usually wanting.

Reophax dentaliniformis—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10147	U.S.N.M.	10+	D2003...	37 16 30 N.; 74 20 36 W..	641	.....	.....	Common.
10148	U.S.N.M.	1	D2018...	37 12 22 N.; 74 20 04 W..	788	39	bu. m.....	Rare.
10149	U.S.N.M.	1	D2034...	39 27 10 N.; 69 56 20 W..	1,346	38	glob. oz.....	Rare.
10150	U.S.N.M.	2	D2039...	38 19 26 N.; 68 20 20 W..	2,369	.....	glob. oz.....	Rare.
10151	U.S.N.M.	1	D2041...	39 22 50 N.; 68 25 00 W..	1,608	38	glob. oz.....	Rare.
10152	U.S.N.M.	1	D2043...	39 49 00 N.; 68 28 30 W..	1,467	38.5	glob. oz.....	Rare.
10153	U.S.N.M.	1	D2072...	41 53 00 N.; 65 35 00 W..	858	39	gy. m.....	Rare.
10154	U.S.N.M.	1	D2073...	41 54 15 N.; 65 39 00 W..	586.5	40	gy. s.....	Rare.
10155	U.S.N.M.	1	D2076...	41 13 00 N.; 66 00 50 W..	906	.....	bu. m.....	Rare.
10156	U.S.N.M.	2	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Rare.
10157	U.S.N.M.	4	D2111...	35 09 50 N.; 74 57 40 W..	938	.....	gn. m.....	Few.
10158	U.S.N.M.	1	D2115...	35 49 30 N.; 74 34 45 W..	843	39	m. fne. s....	Rare.
10159	U.S.N.M.	4	D2160...	23 10 31 N.; 82 20 37 W..	167	.....	co.....	Few.
10160	U.S.N.M.	9	D2189...	39 49 30 N.; 70 26 00 W..	600	39.7	gn. m. s.....	Common.
10161	U.S.M.N.	10+	D2202...	39 38 00 N.; 71 39 45 W..	515	39.1	gn. m.....	Common.
10162	U.S.N.M.	9	D2204...	39 30 30 N.; 71 44 30 W..	728	39.1	br. m.....	Common.
10163	U.S.N.M.	7	D2212...	39 59 30 N.; 70 30 45 W..	428	40	gn. m.....	Common.
10164	U.S.N.M.	1	D2231...	38 29 00 N.; 73 09 00 W..	965	36.8	gy. oz.....	Rare.
10165	U.S.N.M.	3	D2240...	40 27 30 N.; 70 29 00 W..	44	.....	gn. m.....	Few.
10166	U.S.N.M.	3	D2242...	40 15 30 N.; 70 27 00 W..	58	51.4	gn. m.....	Few.
10167	U.S.N.M.	4	D2243...	40 10 15 N.; 70 26 00 W..	63	52.4	gn. m.....	Few.
10168	U.S.N.M.	10+	D2262...	39 54 45 N.; 69 29 45 W..	250	41.6	gn. m. s.....	Common.
10169	U.S.N.M.	10+	D2377...	27 07 30 N.; 88 08 00 W..	210	67	gy. m.....	Common.
10170	U.S.N.M.	1	D2392...	28 47 30 N.; 87 27 00 W..	724	40.7	br. gy. m....	Rare.
10171	U.S.N.M.	1	D2528...	41 47 00 N.; 65 37 30 W..	677	38.7	br. s.....	Rare.
10172	U.S.N.M.	10+	D2530...	40 53 30 N.; 66 24 00 W..	956	38.4	gy. oz.....	Common.
10173	U.S.N.M.	4	D2531...	40 42 00 N.; 66 33 00 W..	852	38.4	gy. m.....	Few.
10174	U.S.N.M.	10+	D2550...	39 44 30 N.; 70 30 45 W..	1,081	38.5	br. m.....	Common.
10175	U.S.N.M.	3	D2562...	39 15 30 N.; 71 25 00 W..	1,434	37.3	gy. oz.....	Few.
10176	U.S.N.M.	10+	D2581...	39 43 00 N.; 71 34 00 W..	394	.....	gn. m.....	Common.
10177	U.S.N.M.	10+	D2677...	32 39 00 N.; 76 50 30 W..	478	39.3	gn. m.....	Common.
10178	U.S.N.M.	9	D2679...	32 40 00 N.; 76 40 30 W..	782	38.6	lt. gy. oz....	Common.
10179	U.S.N.M.	1	D2689...	39 42 00 N.; 71 15 30 W..	525	.....	gn. m.....	Rare.
10180	U.S.N.M.	4	D2710...	40 06 00 N.; 68 01 30 W..	984	.....	gn. m.....	Few.
10181	U.S.N.M.	1	D2748...	39 31 00 N.; 71 14 30 W..	1,163	37.8	gy. m. for....	Rare.
10182	U.S.N.M.	2	D2761...	15 39 00 S.; 38 32 54 W..	818	39	pter. oz.....	Rare.

REOPHAX BACILLARIS H. B. Brady.

Plate 5, fig. 6.

Reophax bacillaris H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 49; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 293, pl. 30, figs. 23, 24.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 257, pl. 4, fig. 33.—de Amicis, Nat. Sic., anno. 14, 1895, p. 72, pl. 1, fig. 17.—Chapman, Proc. Zool. Soc. London, 1895, p. 15.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 27.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 274, pl. 18, fig. 3.—Millett, Journ. Roy. Micr. Soc., 1899, p. 254, pl. 4, fig. 12.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 86, fig. 120.

Description.—Test elongate, regularly tapering in the megalospheric form straight, in the microspheric form usually with a decided angle in the earlier portion, composed of a large number (sometimes

as many as thirty) short chambers, earlier ones, especially in the microspheric form close and indistinct, later ones distinct with constrictions between and the sides rounded, increasing somewhat in length toward the apertural end, wall of fine sand grains of even texture, roughened on the exterior; color gray.

Length of microspheric adults 5–6 mm., of megalospheric 2–3 mm.

Distribution.—The distribution of *Reophax bacillaris* seems to be very definite. The *Challenger* Report described and figured it from *Valarous* station 8, southwest of Greenland, latitude 59° 10′ N.; longitude 50° 25′ W., 1,750 fathoms (3,200 meters), and mentioned "some broken tests belonging to the same species" from the *Porcupine* dredgings south of Rockall Bank, 420 fathoms (768 meters). It was also recorded from 1,070 fathoms (1,957 meters) on the north coast of New Guinea, but Brady mentions that the material except from the first station is "inferior in point of size and distinctiveness." The only other *Challenger* record is station 44, latitude 37° 25′ N.; longitude 71° 40′ W., 1,700 fathoms (3,109 meters), bottom temperature 36.2° F. (2.3° C.). This is almost in the center of distribution shown by the *Albatross* material.

With the four stations given by Flint, *Challenger* station 44 and eighteen stations at which I have found the species there is a definite area off our coast in which the species occurred, latitude 37°–40° N.; and longitude 68°–73° W., in which the species at certain stations may be called abundant. The only other material I have is a specimen very similar from *Albatross* station D2750 off the Leeward Islands.

Egger records the species from the west coast of Africa and an examination of his material is necessary to determine whether it is the same or not.

The material from the area in which it is so common is very well characterized indeed and marked by both microspheric and megalospheric forms. The microspheric is very tapering and has a characteristic change of direction before the last series of chambers is added. The megalospheric form is a straight or slightly curved test with the chambers fairly distinct from the beginning. The early chambers are larger than those immediately succeeding and the appearance from the exterior is that of a *Clavulina*. The three larger specimens in Flint's figure are microspheric, the other a megalospheric specimen. In size, shape, number of chambers, color, and the whole ensemble of characters is very definite, making a well-defined species.

Millett's figured specimen from the Malay Archipelago, while suggesting this species in its tapering shape, is different in the form of the chambers and especially in the aperture. I doubt very much if this Malay form is identical with the well-characterized Atlantic species. Chapman records it from the Arabian Sea, but this again is a case where a reëxamination of the material is desirable and a comparison with the clear-cut characters as here shown.

Reophax bacillaris—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″				
10206	U.S.N.M.	10+	D2035...	39 26 16 N.; 70 02 37 W..	1,362	.....	glob. oz.....	Common.
10207	U.S.N.M.	4	D2037...	38 53 00 N.; 69 23 30 W..	1,731	38	glob. oz.....	Few.
10208	U.S.N.M.	10+	D2038...	38 30 30 N.; 69 08 35 W..	2,033	.....	glob. oz.....	Common.
10209	U.S.N.M.	10+	D2039...	38 19 26 N.; 68 20 20 W..	2,369	.....	glob. oz.....	Common.
10210	U.S.N.M.	10+	D2041...	39 22 59 N.; 68 25 00 W..	1,608	38	glob. oz.....	Common.
10211	U.S.N.M.	8	D2042...	39 33 00 N.; 68 26 45 W..	1,555	38.5	glob. oz.....	Common.
10212	U.S.N.M.	10+	D2043...	39 49 00 N.; 68 28 30 W..	1,467	38.5	glob. oz.....	Common.
10213	U.S.N.M.	1	D2046...	40 02 49 N.; 68 49 00 W..	407	40	bu. m.....	Rare.
10214	U.S.N.M.	5	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Few.
10215	U.S.N.M.	10+	D2105...	37 50 00 N.; 73 03 50 W..	1,395	41	glob. oz.....	Common.
10216	U.S.N.M.	9	D2174...	38 15 00 N.; 72 03 00 W..	1,594	.....	gy. m.....	Common.
10217	U.S.N.M.	10+	D2221...	39 05 30 N.; 70 44 30 W..	1,525	36.9	gy. oz.....	Common.
10218	U.S.N.M.	6	D2226...	37 00 00 N.; 71 51 00 W..	2,045	36.8	glob. oz.....	Few.
10219	U.S.N.M.	6	D2228...	37 25 00 N.; 73 06 00 W..	1,582	36.8	br. m.....	Few.
10522	U.S.N.M.	5	D2229...	37 38 40 N.; 73 16 30 W..	1,423	37.7	glob. oz.....	Few.
10221	U.S.N.M.	6	D2562...	39 15 30 N.; 71 25 00 W..	1,434	37.3	gy. oz.....	Few.
10222	U.S.N.M.	1	D2564...	39 22 00 N.; 71 23 30 W..	1,390	37.3	gy. oz.....	Rare.
10223	U.S.N.M.	1	D2714...	38 22 00 N.; 70 17 30 W..	1,825	.....	br. oz.....	Rare.
10224	U.S.N.M.	1	D2750...	18 30 00 N.; 63 31 00 W..	496	44.5	fne. gy. s....	Rare.

REOPHAX MEMBRANACEUS H. B. Brady.

Reophax membranaceus H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 53, pl. 4, fig. 9; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 297, pl. 32, figs. 1–4.—Millett, Journ. Roy. Micr. Soc., 1899, p. 255, pl. 4, fig. 14.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 90, fig. 126.– Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1606.

Description.—Test small, elongate, slender, slightly curved or straight, composed of several chambers, broadest near the central portion and tapering toward the ends, sutures distinct; wall thin, chitinous, with fine sand particles, often wrinkled transversely; aperture small, circular, at the end of the somewhat truncate neck; color a yellowish or reddish brown.

Length up to 1.4 mm.

Distribution.—In the Atlantic *Challenger* material this species is recorded from off Palma, Canary Islands, in 1,125 fathoms (2,057 meters), and east of Buenos Aires in 1,900 fathoms (3,475 meters). It also occurs in deep water in the Pacific. Pearcey notes it from the Antarctic in 1,775 fathoms (3,246 meters) as rare.

Millett's material from the Malay Archipelago does not seem to be identical with the species figured by Brady and that which I have seen from the Pacific.

R. membranaceus is evidently a species of deep cold water and is either rare or overlooked on account of its small size.

Neither Flint nor I have found it in the *Albatross* material from the Atlantic coast, but this might be expected, for most of the material is not really abyssal in its character, whereas most of the records for this species are from such habitats.

REOPHAX MONILIFORME Siddall.

Reophax (?) sp. Balkwill and Wright, Trans. Roy. Irish Acad., vol. 28, (Sci.), 1885, p. 328, pl. 13, figs. 9, 22–24.—Halkyard, Trans. Ann. Rep. Manchester Micr. Soc., 1889, p. 66, pl. 1, figs. 8–9.

Reophax moniliforme Siddall, Proc. Lit. Philos. Soc. Liverpool, No. 40, 1886, appendix, p. 54, pl. 1, fig. 2.—Heron-Allen and Earland, Journ. Roy. Micr. Soc., 1909, p. 322; Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 43, pl. 2, fig. 12; Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 223.

Description.—Test elongate, subcylindrical, slightly tapering, initial end of the test largest, thence gradually decreasing in diameter to the apertural end or keeping the same diameter throughout after the early portion, in some cases the proloculum large and inflated; wall of fine sand and cement or largely of sponge spicules laid lengthwise of the test; color ferruginous.

Distribution.—This species is only known from the region of the British Isles. It is found especially at several stations in the Clare Island region, western Ireland, and off western Scotland (Heron-Allen and Earland).

One of the peculiar characters of the species is the tendency to break, leaving the apertural end and a few adjacent chambers only. Heron-Allen and Earland, however, have found complete specimens in the Clare Island region. It has not been found on the western side of the Atlantic.

REOPHAX FINDENS (Parker).

Lituola findens Parker, in Dawson, Canad. Nat., vol. 5, 1870, pp. 177, 180, fig. 1.—Siddall, Proc. Chester Soc. Nat. Sci., pt. 2, 1878, p. 47.

Reophax findens Siddall, Catal. British Rec. Foram., 1879, p. 4.—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 299, pl. 32, figs. 10–11.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 257, pl. 4, figs. 28–30.—Heron-Allen and Earland, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 44, pl. 2, fig. 13.—Rhumbler, Foram. Plankton Exped., teil 2, 1913, p. 466, fig. 175.

Description.—Test elongate, one end bifurcate, the other single, chambers of nearly uniform size, aperture at the single end, rounded or elliptical; wall arenaceous, somewhat rough; reddish brown in color.

Length about 1 mm.

Distribution.—The type locality for this species is Gaspe Bay, Gulf of St. Lawrence, in 15–20 fathoms (27-37 meters). The other records are from about the British Isles, the estuary of the Dee (Siddall), and six stations in the Clare Island region on the west coast of Ireland (Heron-Allen and Earland).

This species has been confused with *R. moniliforme*, which, according to Heron-Allen and Earland differs in being smoother than *R. findens* and in using sponge spicules which *R. findens* does not use. The shape when complete is, of course, distinctive.

I have entirely failed to find this species in the Atlantic material which I have examined.

REOPHAX SPICULIFER H. B. Brady.

Reophax spiculifer H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 54, pl. 4, figs. 10, 11; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 295, pl. 31, figs. 16, 17.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 258, pl. 4, fig. 19 (?).—Chapman, Proc. Zool. Soc. London, 1895, p. 14.—Cushman, Bull. 71, U.S.Nat. Mus., pt. 1, 1910, p. 92, figs. 132–133.—Chapman, Rept. Sci. Invest., British Antarctic Exped., Geol., vol. 2, pt. 3, 1918, p. 62, pl. 3, fig. 16.—Cushman, Proc. U. S. Nat. Mus., vol. 56, 1919, p. 598.

Description.—Test composed of a few chambers, each broadest at the posterior end and gradually narrowing toward the apertural end, wall thin, composed of a single layer of elongate sponge spicules, placed side by side and lengthwise of the chamber, often projecting backward beyond the posterior end of the chamber; aperture circular.

Length about 1 mm.

Distribution.—The only Atlantic records for this species are off Sombrero Island, West Indies, 450 fathoms (823 meters). It is known from the Pacific off Tahiti, 620 fathoms (1,134 meters); off Kandavu, 255 (466 meters) and 610 (1,116 meters) fathoms; off the Hawaiian Islands, 2,350 fathoms (4,298 meters); and in the Southern Ocean, from off Kerguelen Island, 20–120 fathoms (37–219 meters); and from Ross Sea, 460–655 fathoms (841–1,198 meters). It is rare at all the stations according to report.

It is one of those species which has selective power of taking sponge spicules from the other constituents of the bottom on which it lives.

REOPHAX ARMATUS Goës.

Reophax armatus Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 29, pl. 1, fig. 1.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 91, fig. 128.

Description.—"The growth of the test is nearly the same as that of *R. distans*, but the segments are provided with 3–6 more or less produced spines or tubes; sometimes it seems as if some of those tubes were in connection with side chambers, so that a construction somewhat like a *Ramulina* is originated. Shell wall thin, light brown, built up by finest sand and sponge spicules, often partly covered with white dust; the surface is often sparingly prickly by sponge needles. The scarcity of the supply has not allowed a closer examination and analysis of this peculiar form."

Distribution.—The record of this species for the Caribbean is *Albatross* H2352, latitude, 22° 35′ N.; longitude 84° 23′ W., off the southwestern coast of Cuba, depth 463 fathoms (847 meters). It was evidently very rare, as noted by Goës.

Millett has suggested [1] that this species of Goës may in reality be a species of *Aschemonella* and perhaps identical with Brady's original *A. catenata*. The character of lateral tubular projections resembles *Aschemonella*. There is no material available that will settle what this form really is.

[1] Journ. Roy. Micr. Soc., 1899, p. 252.

REOPHAX HISPIDULUS, new species.

Plate 5, fig. 7.

Description.—Test elongate, composed of pyriform, flask-shaped chambers, widest at the broadly rounded, somewhat truncate base, apertural end extended, gradually tapering to a slender cylindrical neck; wall composed of fine amorphous material with a large amount of fine sponge spicules, for the most part irregularly arranged, but toward the base of the chamber extending directly backward, especially about the periphery; aperture a small circular opening at the end of a long slender cylindrical neck; color light gray.

Length 3 mm. or more.

Distribution.—Type specimen (U.S.N.M. No. 10670) from D2677 off the southeastern Atlantic coast of the United States, latitude, 32° 39′ N.; longitude 76° 50′ 30″ W., in 478 fathoms, (873 meters) bottom temperature 39.3° F. (3.9°C.)

This seems to be distinct from other spicular forms of the genus. The fine amorphous material with the fine spicules is not unlike the texture of *Crithionina pisum* Goës, var. *hispida* Flint.

REOPHAX CYLINDRICUS H. B. Brady.

Plate 5, fig. 8.

Reophax cylindricus H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 299, pl. 32, figs. 7–9.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 257, pl. 4, fig. 37 (?).—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 274, pl. 18, fig. 6.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 91, figs. 129–131.

Description.—Test elongate, subcylindrical, slightly tapering, the last-formed chamber being of the greatest width, initial end broadly rounded, apertural end tapering with a very short truncate neck and rounded aperture; wall of fine sand grains of uniform size, neatly and firmly cemented, the outer wall smooth; color a yellowish or reddish brown slightly banded, chambers hardly distinguishable from the exterior except by differences in color or by slight constrictions, in section separated by very thick transverse walls.

Length up to 5 mm.

Distribution.—The type specimens of this species were from a station of the *Valorous* southwest of Greenland, latitude 59° 10′ N.; longitude 50° 25′ W., in 1,750 fathoms (3,200 meters). Flint had a single specimen from *Albatross* station D2568 in 1,781 fathoms (3,274 meters) off the northeastern coast of the United States. I have specimens, very typical in character from five stations nearby as noted in the list. It never seems to be common but holds its characters most fixedly.

The one Pacific record has a question mark in the *Challenger* work and but a fragment was recorded in the Southern Ocean. Egger's

record for the west coast of Africa I can not affirm, not having seen his material. The type locality with the six closely adjacent stations off our own coast certainly have the species in typical form and I have examined material from hundreds of stations southward without finding it, nor did I find it from the many Pacific stations examined.

It would seem then that we have here a very well marked species with constant characters and a comparatively limited distribution.

Reophax cylindricus—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10127	U.S.N.M.	1	D2038...	38 30 30 N.; 69 08 35 W..	2,033	.....	glob. oz.....	Rare.
10128	U.S.N.M.	3	D2042...	39 33 00 N.; 68 26 45 W..	1,555	38.5	glob. oz.....	Rare.
10129	U.S.N.M.	3	D2041...	39 22 50 N.; 68 25 00 W..	1,608	38	glob. oz.....	Rare.
10130	U.S.N.M.	1	D2222...	39 03 15 N.; 70 50 45 W..	1,537	36.9	gy. oz.....	Rare.
10131	U.S.N.M.	1	D2562 ..	39 15 30 N.; 71 25 00 W..	1,434	37.3	gy. oz.....	Rare.

REOPHAX SABULOSUS H. B. Brady.

Reophax rudis H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 49.—Carpenter, The Microscope, ed. 6, 1881, p. 563, figs. *a*, *b*.

Reophax sabulosa H. B. Brady, Proc. Roy. Soc. Edinburgh, vol. 11, 1882, p. 715; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 298, pl. 32, figs. 5, 6.—[?]Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 27, pl. 6, figs. 199–202.

Description.—"Test elongate, cylindrical, slightly tapering, sides even and unconstricted, extremities rounded. Walls thick, composed of rather fine gray sand only partially cemented, and showing no external marks of segmentation. The longitudinal section reveals about six segments, each tapering at the summit to a stoloniferous tube, the mouth of which, as well as the external aperture of the test, is stained reddish brown."

"Length, 4/10th inch (10 mm.) or more."

Distribution.—The type specimens came from the cold area of the Faroe Channel and a second dredging in the same area later gave additional specimens, depths 530 and 540 fathoms (969 and 988 meters).

The specimens figured by Goës under this name do not agree in shape, in wall characters or chamber divisions with the type figures and apparently represent something else. The specimens referred to this species from the Caribbean by Goës[1] are labeled by Goës as *R. ammophila* Goës in his collection returned to the United States National Museum and do not seem to be *R. sabulosus* H. B. Brady.

Evidently *R. sabulosus* is a species peculiar to the general region of the Faroe Channel, as are other species now known nowhere else.

[1] Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 28.

Such a striking species would unlikely be overlooked elsewhere and may rank with *Botellina labyrinthica*, *Technitella thompsoni*, *Psammosphaera rustica*, and others as species which so far as we have data are confined to this general region.

Its nearly related form seems to be *R. cylindricus*.

Genus HORMOSINA H. B. Brady, 1879.

Hormosina H. B. Brady (type, *H. globulifera* H. B. Brady), Quart. Journ. Micr. Sci., vol. 19, 1879, p. 56.—Bütschli, in Bronn, Klassen und Ordnungen des Thierreichs, vol. 1, 1880, p. 199.—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 325.—Chapman, The Foraminifera, 1902, p. 149.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 93.

Description.—Test free, composed of a linear series of subglobular, fusiform, or pyriform chambers joined end to end in a single moniliform series, straight, somewhat curved or irregular; walls usually thin, finely arenaceous with an excess of cement, chambers undivided; aperture a single circular opening usually at the dorsal end of the last-formed chamber, often with a neck, but occasionally at the side of the chamber; color yellowish or reddish brown.

This genus differs from *Reophax* mainly in its finer texture, smooth surface and reddish brown or yellowish color, all due to the excessive amount of cement and fine particles of which the test is composed.

As a rule the genus seems to be characteristic of rather deep water.

HORMOSINA GLOBULIFERA H. B. Brady.

Plate 6, fig. 1.

Hormosina globulifera H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 60, pl. 4, figs. 4, 5.—W. B. Carpenter, The Microscope, 6th ed., 1881, p. 563, fig. 320*c* (in text).—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 326, pl. 39, figs. 1–6.—De Folin, Le Naturaliste, vol. 10, 1888, p. 87, figs. 1, 2.—J. Wright, Proc. Roy. Irish Acad., vol. 1, 1891, p. 468.—Chapman, Journ. Roy. Micr. Soc., 1892, p. 326, pl. 6, figs. 10*a*, *b*.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 29, pl. 6, figs. 218, 219.—Chapman, Proc. Zool. Soc. London, 1895, p. 17.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 34.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 280, pl. 24, fig. 4.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 93, figs. 136–137.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1007.—Heron-Allen and Earland, Trans. Zool. Soc. London, vol. 20, 1915, p. 617, pl. 46, fig. 25.

Description.—Test typically composed of a few nearly spherical chambers, each much larger than its predecessor and slightly embracing it proximally, sutures very distinct, chambers in a simple straight or slightly curved line; wall composed of fine arenaceous material with an excess of reddish or yellowish brown cement, surface smoothly finished both within and without, comparatively thin; aperture small, circular, at the end of a short tubular neck.

Length up to nearly 5 mm.

Distribution.—From all the available specimens and records this is a widely distributed species but occurs most abundantly, as far as

the material I have examined shows, in cool waters, being best developed in the cold water off the northeastern coast of the United States. It does not appear to be common either in the Arctic or Antarctic. It is more characteristic of deep waters, nearly all stations at which it was really abundant being over 1,500 fathoms (2,743 meters) with the greatest development around 2,000 fathoms (3,658 meters).

Both microspheric and megalospheric specimens evidently occur. In the former the proloculum is very small and the number of chambers reaches the maximum, five to six. In the megalospheric specimens the proloculum is large and the number of chambers is from one to three. In the extreme cases where a single chamber is produced it is as large as the final chamber in the adult of three chambered specimens. This accords with what Schlumberger showed in the development of various species of *Biloculina*.

Outside this character of developmental stages there is little variation in the species except perhaps in the fineness of the material of the chamber walls and the relative amount of the cement used in the wall. Altogether it is a very constant and satisfactory species.

Hormosina globulifera—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
			Albatross.	° ′ ″ ° ′ ″		°F		
10054	U.S.N.M.	3	D2003...	37 16 30 N.; 74 20 36 W..	641	.....	.....	Few.
10051	U.S.N.M.	5	D2018...	37 12 22 N.; 74 20 04 W..	788	39	bu. m.....	Few.
10053	U.S.N.M.	10+	D2035...	39 26 16 N.; 70 02 37 W..	1,362	.....	glob. oz.....	Common.
10265	U.S.N.M.	6	D2036...	38 52 40 N.; 69 24 40 W..	1,735	38	glob. oz.....	Few.
10003	U.S.N.M.	10+	D2037...	38 53 00 N.; 69 23 30 W..	1,731	38	glob. oz.....	Common.
10004	U.S.N.M.	10+	D2038...	38 30 30 N.; 69 08 25 W..	2,033	.....	glob. oz.....	Common.
10005	U.S.N.M.	10+	D2039...	38 19 26 N.; 68 20 20 W..	2,369	.....	glob. oz.....	Common.
10055	U.S.N.M.	2	D2041...	39 22 50 N.; 68 25 00 W..	1,608	38	glob. oz.....	Rare.
10006	U.S.N.M.	9	D2042...	39 33 00 N.; 68 26 45 W..	1,555	38.5	glob. oz.....	Common.
10007	U.S.N.M.	10+	D2043...	39 49 00 N.; 68 28 30 W..	1,467	38.5	glob. oz.....	Common.
10056	U.S.N.M.	5	D2052...	39 40 05 N.; 69 21 25 W..	1,098	45	glob. oz.....	Few.
10008	U.S.N.M.	4	D2072...	41 53 00 N.; 65 35 00 W..	858	39	gy. m.....	Few.
10037	U.S.N.M.	1	D2089...	39 58 50 N.; 70 39 40 W..	168	45	gy. s.....	Rare.
10057	U.S.N.M.	1	D2096...	39 22 20 N.; 70 52 20 W..	1,451	37.5	glob. oz.....	Rare.
10058	U.S.N.M.	10+	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Common.
10009	U.S.N.M.	2	D2105...	37 50 00 N.; 73 03 50 W..	1,395	41	glob. oz.....	Rare.
10010	U.S.N.M.	2	D2111...	35 09 50 N.; 74 57 40 W..	938	.....	gn. m.....	Rare.
10011	U.S.N.M.	1	D2115...	35 49 30 N.; 74 34 45 W..	843	39	m., fne. s....	Rare.
10059	U.S.N.M.	1	D2140...	17 36 10 N.; 76 46 05 W..	966	39.7	s.....	Rare.
10012	U.S.N.M.	3	D2160...	23 10 31 N.; 82 20 37 W..	167	.....	co.....	Rare.
10013	U.S.N.M.	3	D2171...	37 59 30 N.; 73 48 40 W..	444	39.5	gn. m.....	Rare.
10014	U.S.N.M.	10+	D2174...	38 15 00 N.; 72 03 00 W..	1,594	.....	gy. m.....	Common.
10015	U.S.N.M.	1	D2189...	39 49 30 N.; 70 26 00 W..	600	39.7	gn. m. s.....	Rare.
10016	U.S.N.M.	3	D2192...	39 46 30 N.; 70 14 45 W..	1,060	38.6	gy. oz.....	Few.
10052	U.S.N.M.	6	D2202...	39 38 00 N.; 71 39 45 W..	515	39.1	gn. m.....	Few.
10017	U.S.N.M.	6	D2203...	39 34 15 N.; 71 41 15 W..	705	38.9	gn. m. s.....	Few.
10018	U.S.N.M.	3	D2204...	39 30 30 N.; 71 44 30 W..	728	39.1	br. m.....	Rare.
10019	U.S.N.M.	3	D2208...	39 33 00 N.; 71 16 15 W..	1,178	38.4	gn. m.....	Rare.
10020	U.S.N.M.	2	D2212...	39 59 30 N.; 70 30 45 W..	428	40	gn. m.....	Rare.
10021	U.S.N.M.	1	D2217...	39 47 20 N.; 69 34 15 W..	924	38.1	gy. m.....	Rare.
10022	U.S.N.M.	10+	D2221...	39 05 30 N.; 70 44 30 W..	1,525	36.9	gy. oz.....	Common.
10060	U.S.N.M.	9	D2222...	39 03 15 N.; 70 50 45 W..	1,537	36.9	gy. oz.....	Common.
10023	U.S.N.M.	10+	D2226...	37 00 00 N.; 71 54 00 W..	2,045	36.8	glob. oz.....	Common.
10024	U.S.N.M.	10+	D2228...	37 25 00 N.; 73 06 00 W..	1,582	36.8	br. m.....	Common.
10061	U.S.N.M.	1	D2229...	37 38 40 N.; 73 16 30 W..	1,423	37.7	glob. oz.....	Rare.
10025	U.S.N.M.	2	D2234...	39 09 00 N.; 72 03 15 W..	810	38.6	gn. m.....	Rare.
10026	U.S.N.M.	5	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Few.
10027	U.S.N.M.	1	D2504...	44 23 00 N.; 61 22 45 W..	82	40.6	bk. m. g.....	Rare.

Hormosina globulifera—material examined—Continued.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
			Albatross	° ′ ″ ° ′ ″		°F		
10038	U.S.N.M.	6	D2530...	40 53 30 N.; 66 24 00 W..	956	38.4	gy. oz.....	Few.
10028	U.S.N.M.	2	D2531...	40 42 00 N.; 66 33 00 W..	852	38.4	gy. m.....	Rare.
10029	U.S.N.M.	7	D2547...	39 54 30 N.; 70 20 00 W..	390	39.6	gn. m.....	Frequent.
10039	U.S.N.M.	8	D2550...	39 44 30 N.; 70 30 45 W..	1,081	38.5	br. m.....	Frequent.
10030	U.S.N.M.	8	D2550...	39 44 30 N.; 70 30 45 W..	1,081	38.5	br. m.....	Frequent.
10031	U.S.N.M.	8	D2552...	39 47 07 N.; 70 35 00 W..	721	39.6	gy. oz.....	Frequent.
10032	U.S.N.M.	10	D2562...	39 15 30 N.; 71 25 00 W..	1,434	37.3	gy. oz.....	Common.
10062	U.S.N.M.	6	D2564...	39 22 00 N.; 71 23 30 W..	1,390	37.3	gy. oz.....	Few.
10033	U.S.N.M.	2	D2571...	40 09 30 N.; 67 09 00 W..	1,356	37.8	gy. glob. oz.	Few.
10034	U.S.N.M.	8	D2581...	39 43 00 N.; 71 34 00 W..	394	.....	gn. m.....	Common.
10049	U.S.N.M.	10+	D2682...	39 38 00 N.; 70 22 00 W..	1,004	.....	gn. m. s.....	Common.
10041	U.S.N.M.	5	D2705...	42 47 00 N.; 61 04 00 W..	1,255	.....	lt. br. oz....	Common.
10040	U.S.N.M.	10+	D2706...	41 28 30 N.; 65 35 30 W..	1,188	.....	gy. oz. for...	Common.
10042	U.S.N.M.	1	D2710...	40 06 00 N.; 68 01 30 W..	984	.....	gn. m.....	Rare.
10043	U.S.N.M.	7	D2713...	38 20 00 N.; 70 08 30 W..	1,859	.....	br. oz.....	Few.
10044	U.S.N.M.	10+	D2714...	38 22 00 N.; 70 17 30 W..	1,825	.....	br. oz.....	Common.
10045	U.S.N.M.	10	D2716...	38 29 30 N.; 70 57 00 W..	1,631	.....	br. oz. for...	Common.
10046	U.S.N.M.	3	D2739...	37 34 30 N.; 73 58 00 W..	811	38.2	gy. m.....	Few.
10047	U.S.N.M.	8	D2750...	18 30 00 N.; 63 31 00 W..	496	44.5	fne. gy. s....	Frequent.
10048	U.S.N.M.	3	D2760...	12 07 00 S.; 39 17 00 W...	1,019	39.5	br. co.....	Few.
10050	U.S.N.M.	1	H79.....	14 20 30 N.; 63 10 00 W..	821	.....	co. s. sh. for.	Rare.
			Fish Hawk.					
10063	U.S.N.M.	1	891.....	.....	1,360	37.4	glob. oz.....	Rare.
			Porcupine.					
6252	U.S.N.M.	10+	19.....	54 53 00 N.; 10 56 00 W..	.....	.....	.....	Common.

HORMOSINA OVICULA H. B. Brady.

Plate 6, fig. 2.

Hormosina ovicula H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 61, pl. 4, fig. 6.—Bütschli, in Bronn, Klassen und Ordnungen des Thierreichs, vol. 1, 1880, p. 199, pl. 5, fig. 15.—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 327, pl. 39, figs. 7–9.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 29, pl. 6, figs. 220, 221.—Chapman, Proc. Zool. Soc. London, 1895, p. 17.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 280, pl. 25, fig. 2.—Chapman, The Foraminifera, 1902, p. 149, pl. 8, fig. C.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 95, fig. 138*a*, *b*.

Hormosina ovicula, var., Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 34, pl. 4, fig. 1–3.

Description.—Test long and slender, slightly tapering, composed of several fusiform chambers in a straight or slightly curved line, the base of one chamber inclosing only the end of the apertural neck of the preceding; wall thin, finely arenaceous, with abundant cement, often with a thin granular coating of light gray amorphous material and occasionally a few sponge spicules; aperture small, circular, at the end of a short, cylindrical neck, often with a short phialine lip; color yellowish brown with a distinctly darker reddish brown portion at the distal end of the neck of each chamber.

Length up to 4 mm.

Distribution.—The records for this species are not numerous. In the North Atlantic Brady had one or two specimens only from a single station off the American coast at about 40° N. latitude. It is also recorded from a *Challenger* station off Culebra Island, West Indies, and at two stations off the coast of South America. Flint records it from the southeastern coast of the United States and from the Gulf of Mexico. Goës records it from the Gulf of Mexico and the Caribbean.

The only east coast specimens I have seen are from D2505, off Nova Scotia. The remainder of the specimens are all from the Gulf of Mexico and the Caribbean Sea. The Gulf of Mexico stations are from the same or adjacent stations to those from which Goës and Flint recorded the species. The single Caribbean station, D2140, is from south of Jamaica, the material in the Goës collection.

In form and coloration this species is well marked. It is perhaps nearest to *H. carpenteri*, but is usually straight, where *H. carpenteri* is usually irregular and crooked and of much larger size. In the Gulf of Mexico, however, the species often has a coating of fine gray material and occasionally sponge spicules resembling the exterior of *H. carpenteri*. Flint's figured specimens show this character; also the more rounded chambers which the specimens from the Gulf of Mexico often have.

Hormosina ovicula—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		° F.		
10067	U.S.N.M.	3	D2377...	27 07 30 N.; 88 08 00 W..	210	67	gy. m.....	Few.
10068	U.S.N.M.	5	D2381...	28 05 00 N.; 87 56 15 W..	1,330	.....	lt. br. m....	Few.
10069	U.S.N.M.	1	D2393...	28 43 00 N.; 87 14 30 W..	525	41.1	lt. gy. m....	Rare.
10070	U.S.N.M.	3	D2394...	28 38 30 N.; 87 02 00 W..	420	41.8	gn. m.....	Few.
10071	U.S.N.M.	10+	D2399...	28 44 00 N.; 86 18 00 W..	196	51.6	gy. m.....	Common.
10072	U.S.N.M.	8	D2505...	44 23 30 N.; 61 44 15 W..	93	42.3	dk. br. m...	Few.
		10	D2140...	17 36 10 N.; 76 46 05 W..	966	39.7	s.....	Few.

HORMOSINA OVICULA H. B. Brady, var. MEXICANA, new variety.

Plate 6, fig. 3.

Hormosina carpenteri Goës (not *H. carpenteri* H. B. Brady), Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 35.—Flint, Ann. Rep. U. S. Nat. Mus., 1897 (1899), p. 280, pl. 25, fig. 1.

Description.—Test comparatively large, composed of numerous (as many as eight) chambers, remote, usually in a straight or slightly curved line, pyriform or fusiform, tapering toward the apertural end, which is slender, walls arenaceous, usually bristly with fine spicules; aperture small, circular, at the end of the slender neck: color yellowish brown.

Length up to 10 mm.

Distribution.—Type specimen (U.S.N.M. No. 10081) from *Albatross* station D2383 from the Gulf of Mexico. It occurs at several stations in this area, the following being recorded by Flint in addition to those given here, D2382, D2398, and D2400, all in the Gulf of Mexico.

This is much larger than typical *H. ovicula*, and I am not sure but that much if not all of the material placed under *H. ovicula* from the Gulf of Mexico had not better be placed here. It is very different from northern typical *H. carpenteri* when the two are seen together. It is worthy of note that the specimens in the Goës collection are labeled by him "*H. ovicula* var. *carpenteri*," evidently showing his indecision as to which of these two species to assign his specimens when he labeled them.

Hormosina ovicula, var. *mexicana*—*material examined.*

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		° F.		
.....	.....	3	D2140...	17 36 10 N.; 76 46 05 W..	966	39.7	s.....	Few.
10080	U.S.N.M.	8	D2150...	13 34 45 N.; 81 21 10 W..	382	45.75	wh. crs. s....	Few.
10081	U.S.N.M.	10+	D2383...	28 32 00 N.; 88 06 00 W..	1,181	39.8	br. gn. m....	Common.
10082	U.S.N.M.	6	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Few.

HORMOSINA MONILE H. B. Brady.

Plate 6, fig. 4.

Hormosina monile H. B. Brady, Quart. Journ. Micr. Soc., vol. 21, 1881, p. 52; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 328, pl. 39, figs. 10–13.

Description.—Test composed of numerous subglobular chambers, of nearly equal size in a straight or somewhat irregular series; wall finely arenaceous, firmly cemented, fairly smooth on the exterior except for the ends of sponge spicules protruding from the wall; color light ruddy brown.

Length up to 6 mm.

Distribution.—Brady's only record for this species is *Challenger* station 122 off Pernambuco, Brazil, in 350 fathoms (640 meters). The material I have here referred to this species is not found at any of the stations in any considerable numbers, that from the Leeward Islands being the most nearly typical.

Hormosina monile—*material examined.*

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		° F.		
10073	U.S.N.M.	1	D2038...	38 30 30 N.; 69 08 25 W..	2,033	.....	glob. oz.....	Rare.
10074	U.S.N.M.	2	D2041...	39 22 50 N.; 68 25 00 W..	1,608	38	glob. oz.....	Rare.
10075	U.S.N.M.	3	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Rare.
10076	U.S.N.M.	1	D2751...	16 54 00 N.; 63 12 00 W..	687	40	bu. glob. oz..	Rare.

HORMOSINA OVALIFORMIS Cushman.

Plate 6, fig. 5.

Hormosina ovaliformis CUSHMAN, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 438, figs. 5, 6 (in text).

Hormosina monile CUSHMAN (not *H. monile* H. B. Brady), Proc. U. S. Nat. Mus., vol. 42, 1912, p. 229, pl. 28, figs. 9, 10.

Description.—Test composed of a straight or more often slightly arcuate series of chambers closely joined to one another, chambers evenly tapering at either end or slightly oval; wall of fine sand and a reddish brown cement, slightly roughened on the exterior, interior smooth; aperture small, rounded, at the end of the chamber, without a definite neck; color dark brick red.

Length up to 3.5 mm.

Distribution.—This species originally described from the Philippine region seems to be present in the Gulf of Mexico and the Caribbean Sea. I have had it from the five stations here given and also have found specimens in the Goës collection labeled by him, "*H. ovicula*, forma *sphaeriferus*" showing that he had noted the difference between this and other species. The very dark red color of the specimens of the Gulf of Mexico and Caribbean will distinguish them from other species of the genus in those areas. It may be found to be distinct from the Philippine species.

Hormosina ovaliformis—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10064	U.S.N.M.	1	D2377...	27 07 30 N.; 88 08 00 W..	210	67	gy. m.....	Rare.
10677	U.S.N.M.	1	D2378...	29 14 30 N.; 88 09 30 W..	68	.....	gy. m.....	Rare.
10065	U.S.N.M.	1	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Rare.
10066	U.S.N.M.	1	D2309...	28 44 00 N.; 86 18 00 W..	196	51.6	gy. m.....	Rare.
10678	U.S.N.M.	2	H58.....	17 45 20 N.; 65 35 35 W..	1,345	.....	.....	Rare.

HORMOSINA CARPENTERI H. B. Brady.

Plate 6, fig. 6.

"Moniliform *Lituola*," W. B. CARPENTER, The Microscope, ed. 5, 1875, p. 531, fig. *f*.

Hormosina carpenteri H. B. BRADY, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 51.—W. B. CARPENTER, The Microscope, ed. 6, 1881, p. 563, fig. *f*.—H. B. BRADY, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 327, p. 39, figs. 14–18.

Description.—Test composed of numerous chambers, nearly uniform in size arranged in a tortuous line, chambers elongate pyriform, broadly rounded at the base, tapering gradually to the apertural end, wall arenaceous, firmly cemented, exterior roughened, interior smooth; aperture circular, fairly large, at the truncate end of the chamber; color light yellowish brown.

Length up to 20 mm.

Distribution.—From all the records this is mainly a North Atlantic species. Brady records its occurrence from the Faroe Channel, the west coast of Ireland, and the Rockall Bank to North America, and from the Azores and Canaries to the West Indies, with a station off Pernambuco, Brazil, and another in the South Pacific.

Goës and Flint record the species from the Gulf of Mexico and Caribbean Sea, but this material is here referred to *H. ovicula* as a variety. It differs decidedly from the typical northern material.

I have had the species in very typical form from five *Albatross* stations off the northeastern coast of the United States. Also I have been fortunate in having from the United States National Museum a series from Carpenter from a *Valorous* station. This shows the same characters as the *Albatross* material from the northern station. It consists of a series of chambers, elongate pyriform in shape, fitting well over the neck of the preceding chamber, the tapering sides at the apertural end nearly straight or but very slightly concave, the end broad and truncate and the aperture without an elongate neck except for the tapering shape of the chamber. The color is a light yellowish brown and the surface decidedly sandy and although smooth to the unaided eye under the microscope the surface layer of grains is seen to be considerably roughened.

Such characters are developed off the northeastern coast of the United States, especially in deep cold water, but not in the Gulf of Mexico, and the material from this region seems to be distinct.

Hormosina carpenteri—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10077	U.S.N.M.	10+	D2035...	39 26 16 N.; 70 02 37 W..	1,362	.....	glob. oz.....	Common.
10078	U.S.N.M.	10+	D2038...	38 30 30 N.; 69 08 25 W..	2,033	.....	glob. oz.....	Common.
10079	U.S.N.M.	5	D2039...	38 19 26 N.; 68 20 20 W..	2,369	.....	glob. oz.....	Few.
10083	U.S.N.M.	3	D2713...	38 20 00 N.; 70 08 30 W..	1,859	.....	br. oz.....	Few.
10084	U.S.N.M.	10+	D2714...	38 22 00 N.; 70 17 30 W..	1,825	.....	br. oz.....	Common.
6251	U.S.N.M.	6	*Valorous* 9.	.....	1,750	.....	.....	

HORMOSINA NORMANI H. B. Brady.

Plate 7, fig. 1.

Hormosina normani H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 52; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 329, pl. 39, figs. 19–23.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 95, fig. 139.—Rhumbler, Foram. Plankton Exped., teil 2, 1913, p. 441, fig. 144.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1007.

Description.—Test irregular, composed of a few nearly spherical chambers, rapidly increasing in size as added, very irregularly arranged; wall thin, of fine sand grains, with much cement, wall

smooth; aperture small, circular, often with a short, cylindrical neck at the end or more often at the side or even near the base of the chamber; color yellowish brown.

Length up to 8 mm.

Distribution.—Brady gives this species as very rare. He had it from a *Valorous* station about latitude 59° N. in 1,750 fathoms (3,200 meters) and *Porcupine* station northwest of Ireland in 1,380 fathoms (2,524 meters). Pearcey records it from the Antarctic.

In the *Albatross* material it has occurred at six stations, three of them off our northeastern coast, one off the Leeward Islands, the others off South America, off Bahia, and Buenos Aires. Those from the northern stations are from deep water, the others much more shallow.

It is also known from the North Pacific east of Japan and from the South Pacific west of Chile and from off New Zealand.

The irregular form seems to be largely due to the peculiar character of lack of definiteness in the position of the aperture. When this occurs at the side the next chamber is added there and a very irregular form thus results.

Hormosina normani—*material examined.*

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10085	U.S.N.M.	1	D2713...	38 20 00 N.; 70 08 30 W..	1,859	.....	br. oz.....	Rare.
10086	U.S.N.M.	10+	D2714...	38 22 00 N.; 70 17 30 W..	1,825	.....	br. oz.....	Common.
10087	U.S.N.M.	1	D2716...	38 29 30 N.; 70 57 00 W..	1,631	.....	br. oz. for...	Rare.
10088	U.S.N.M.	1	D2759...	18 30 00 N.; 63 31 00 W..	496	44.5	fne. gy. s....	Rare.
10089	U.S.N.M.	4	D2760...	12 07 00 S.; 37 17 00 W..	1,019	39.5	br. co.....	Few.
10090	U.S.N.M.	4	D2766...	36 47 00 S.; 56 23 00 W..	10.5	.....	S. brk. sh...	Few.

Genus HAPLOSTICHE Reuss, 1861.

Nodosaria (part) d'Orbigny, Ann. Sci. Nat., vol. 7, 1826, p. 252.—Reuss, Vers. Böhm, Kreide, vol. 1, 1845–1846, p. 26, pl. 13, figs. 12–13.

Lituola (part) Jones and Parker, Quart. Journ. Geol. Soc., vol. 16, 1860, p. 307.

Haplostiche Reuss, Sitz. Böhm. Ges. Wiss., Jahrg. 1861, p. 16 (Type, *H. foedissima* Reuss, 1865).—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 317.—Chapman, The Foraminifera, 1902, p. 141.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 96.

Description.—Test free, cylindrical or tapering, composed of a linear series of chambers, interior labyrinthic; walls thick, coarsely arenaceous, but usually fairly smooth on the exterior; aperture terminal in the middle of the distal portion of the last-formed chamber, in the earlier chambers usually simple, in the adult made up of several pores or in large specimens often dendritic, occasionally with a short neck.

There seems to be but a single recent species occurring in shallow or medium depths, usually in tropical or subtropical waters.

The genus seems to occur on the western side of the Atlantic only, thence across the Pacific, where in shallow waters it is often very abundant.

Both microspheric and megalospheric forms occur.

HAPLOSTICHE DUBIA (d'Orbigny).

Plate 7, figs. 2, 3.

"Orthoceratia Zoophytica minuscula" Soldani, Testaceographica, vol. 1, pt. 2, 1791, p. 93, pl. 98, fig. *a*.

Nodosaria dubia d'Orbigny, Ann. Sci. Nat., vol. 7, 1826, p. 252, No. 10.

Lituola dubia Parker, Jones, and H. B. Brady, Ann. Mag. Nat. Hist., ser. 4, vol. 8, 1871, p. 263, pl. 9, fig. 30.

Lituola soldanii Jones and Parker, Quart. Journ. Geol. Soc., vol. 16, 1860, p. 307, No. 184.

Haplostiche soldanii H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 318, pl. 32, figs. 12–18.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 263, pl. 4, figs. 34, 35.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 277, pl. 21, fig. 3.—Chapman, The Foraminifera, 1902, p. 141, pt. 7, figs. *H, h*.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 96, figs. 140–141.

Description.—Test free, elongate, subcylindrical, fusiform or ovate, made up of a usually straight, linear series of short chambers, labyrinthic in the interior; wall of coarse sand grains, firmly cemented, forming a smooth exterior except where eroded, thick; aperture in the early chambers a single opening, in adults becoming cruciform, dendritic, or in some specimens several openings formed by the fusing of the walls; color usually light gray.

Length up to 7.5 mm., diameter up to 2 mm.

Distribution.—In the Atlantic *H. dubia* seems to be restricted to the western portion from Bermuda at the north through the West Indies and Gulf of Mexico and along the coast of South America. In general it is associated with the coral reef fauna and comparatively shallow tropical waters. Brady records it from off Bermuda, in 435 fathoms (796 meters); off Jamaica, 50–100 fathoms (91–183 meters); off Culebra Island, 390 fathoms (713 meters); off South America, south of Pernambuco, 350 fathoms (640 meters); and off Rio Janeiro and from the Abrolhos Bank, off Brazil, 40–47 fathoms (73–86 meters).

Flint had it from two *Albatross* stations in the Gulf of Mexico, D2377 and D2399, in 210 and 196 fathoms (384 and 356 meters), respectively. I have had it from these and two other stations in the same region, as well as one station from the north coast of Cuba. Material available from the general West Indian region is scanty and its distribution is probably wide in the region. It is known

elsewhere from off New Zealand, off the Fiji Islands (Brady), off western Australia (Egger), in the North Pacific off the Hawaiian Islands (Bagg, Cushman), and off Japan (Cushman).

Both microspheric and megalospheric forms occur, the microspheric being much larger in size and having the labyrinthic chambers more complex and the aperture dendritic, while in the megalospheric form it is smaller and simpler throughout.

HAPLOSTICHE DUBIA (d'Orbigny), var. INTERMEDIA Vanden Broeck.

Plate 7, fig. 4.

Lituola soldanii d'Orbigny, var. *intermedia* Vanden Broeck, Ann. Soc. Belg. Micr., vol. 2, 1876, p. 74, pl. 2, figs. 1, 3, 4, 6.—Cushman, Publ. 291, Carnegie Inst. Washington, 1919, p. 30, pl. 6, figs. 1–4.

Description.—Test larger than in the typical, more tapering, the chambers more distinctly marked by depressed sutures.

Vanden Broeck's specimens were from 100 fathoms (183 meters) off the Barbados. I have the variety from 100 fathoms (183 meters) also off the Barbados and two apparently similar specimens from *Albatross* D2378 in the Gulf of Mexico with the typical form. This is the fossil form of the species recorded from the Bowden beds of Jamaica.

Haplostiche dubia—*material examined*

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10225	U.S.N.M.	1	D2339...	23 10 40 N.; 82 20 15 W..	191	...	co	Rare.
10226	U.S.N.M.	1	D2377...	29 07 30 N.; 88 08 00 W..	210	67	gy. m.....	Few.
10227	U.S.N.M.	10+	D2378...	29 14 30 N.; 88 09 30 W..	68	...	gy. m.....	Common.
10228	U.S.N.M.	10+	D2399...	28 44 00 N.; 86 18 00 W..	196	51.6	gy. m.....	Common.
10229	U.S.N.M.	9	D2404..	28 44 00 N.; 85 16 00 W..	60	...	gy. s.....	Common.

Subfamily 3. Trochammininae.

Description.—Test composed of several chambers, either in a planospiral coil, trochoid, or otherwise arranged, wall composed of sand grains of varying degrees of coarseness cemented with a calcareous or ferruginous cement, free or attached.

This subfamily as here used contains the many-chambered arenaceous forms not arranged in a linear series throughout. Except the large, somewhat anomalous forms, *Neusina agassizii* and *Botellina labyrinthica* for which a separate subfamily has been made. Some of the species, such as *Ammobaculites tenuimargo*, appear to be largely made up of a linear series, but have a close-coiled early portion not seen in the Reophacinae.

Genus TROCHAMMINOIDES Cushman, 1910.

Trochamminoides Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 97. (Type, *Trochammina proteus* Karrer.)

Description.—Test free, typically planospiral, composed of several coils, each constricted into a number of chamber-like portions with the openings between large; wall of fine sand and a yellowish-brown cement; aperture simple at the end of the last-formed chamber.

This species frequently shows a tendency to continue the *Ammodiscus* condition through one or more of the early coils, and the later portion only may be divided; or in other specimens the divisions may occur much earlier. By its early development the genus seems to have been derived from an *Ammodiscus* condition, as its earlier development consists of a proloculum and long coiled chamber as in *Ammodiscus*, but its later constricted condition foreshadows the condition of complete division seen in the chambered coiled forms usually assigned to *Haplophragmium* and *Trochammina*.

TROCHAMMINOIDES PROTEUS (Karrer).

Plate 8, fig. 7.

Trochammina proteus Karrer, Sitz. Akad. Wiss. Wien, vol. 52 (Abth. 1), 1865 (1866), p. 494, pl., fig. 8 (not 1–7).—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 341, pl. 40, figs. 1–3.—Haeusler, Neues Jahrb., Beil, vol. 4, 1885, p. 28, pl. 3, fig. 24 (25–27?).—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 266, pl. 5, figs. 7, 8 (?).—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 33.—Eimer and Fickert, Zeitschr. Wiss. Zool., vol. 65, 1899, p. 694, fig. 42 (in text).—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 281, pl. 25, fig. 3.—Bagg, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 128.

Trochamminoides proteus Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 98, figs. 142–144.

Ammodiscus proteus Rhumbler, Arch. Prot., vol. 3, 1903, p. 281, fig. 131 (in text).

Description.—Test free, typically planospiral, composed of several coils, the earlier ones usually unconstricted and undivided, the later ones divided into several chambers with corresponding constrictions of the wall; material of the wall fine sand and a yellowish or reddish-brown cement, fairly smooth; chambers of unequal length; aperture large with the border thickened.

Diameter, 1–1.5 mm.

Distribution.—From the records this is a widely distributed but not common species. The *Challenger* specimens are from off the Canaries, 1,125 fathoms (2,057 meters); two stations off Culebra Island, West Indies, 390 and 450 fathoms (713 and 823 meters); and off Brazil, 675 fathoms (1,234 meters). Goës had it from the Caribbean and Flint from both the Caribbean and Gulf of Mexico. I have had it in the *Albatross* material from off Nova Scotia, in the Gulf of Mexico, off Yucatan, and from the Caribbean.

It seems rather difficult to distinguish between this species and the early chambers of *Lituotuba lituiformis*. There are also two forms both of which are figured by Brady in the *Challenger* Report. Figures 1 and 2 of plate 40 in that report show specimens more or less irregularly coiled in the early portion and the chambers much longer than wide. Figure 3 of the same plate shows a form in which the chambers are of nearly equal size, about as long as wide and the whole test planospiral. Such specimens occurred at D2383 in the Gulf of Mexico but were not obtained elsewhere, the others all being of the irregular form first noted.

Trochamminoides proteus—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″	°F.			
10615	U.S.N.M.	1	D2355...	20 56 48 N.; 86 27 00 W..	399	.....	yl. oz.....	Rare.
10616	U.S.N.M.	3	D2383...	28 32 00 N.; 88 06 00 W..	1,181	39.8	br. gn. m...	Rare.
10230	U.S.N.M.	1	D2393...	28 43 00 N.; 87 14 30 W..	525	41.1	lt. gy. m.....	Rare.
10231	U.S.N.M.	2	D2394...	28 38 30 N.; 87 02 00 W..	420	41.8	gn. m.....	Rare.
10232	U.S.N.M.	2	D2505...	44 23 30 N.; 61 44 15 W..	93	42.3	dk. br. m....	Rare.
10233	U.S.N.M.	1	H47.....	17 46 30 N.; 65 10 25 W..	1,482	.....	crs. co. s. brk. sh. for.	Rare.
10234	U.S.N.M.	1	H79.....	14 20 30 N.; 63 10 00 W..	821	.....	co. s. sh. for..	Rare.

Genus HAPLOPHRAGMOIDES Cushman, 1910.

Haplophragmoides Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 99 (Type *Haplophragmium canariense* (d'Orbigny)).

Description.—Test free, planospiral, composed of several coils, each composed of a number of chambers, wall arenaceous, varying much in texture and in the relative amount of cement in the different species, aperture at the ventral border or on the lower portion of the apertural face of the chamber.

Included in this genus are the various completely coiled, planospiral, arenaceous species with simple apertures which have usually been assigned to *Haplophragmium* or *Trochammina*. The type species of the former genus is an uncoiled form with multiple apertures, and the type species of the latter genus has a trochoid spiral test. As here recognized, the species of *Haplophragmoides* have approximately an equal portion of chambers of the test visible from the two sides. Included here are both the species with an excess of cement often placed in *Trochammina* and those of coarser texture, which have been assigned to *Haplophragmium*.

HAPLOPHRAGMOIDES CANARIENSIS (d'Orbigny).

Plate 8, fig. 1.

Nonionina canariensis d'Orbigny in Barker-Webb and Berthelot, Hist. Nat. Îles Canaries, vol. 2, pt. 2, Foraminifères, 1839, p. 128, pl. 2, figs. 33,34.

Placopsilina canariensis Parker and Jones, Ann. Mag. Nat. Hist., ser. 2, vol. 19, 1857, p. 301, pl. 10, figs. 13, 14.

Lituola canariensis W. B. Carpenter, Parker, and Jones, Intr. Foram., 1862, pl. 6, figs. 39, 40, 41.—H. B. Brady, Trans. Linn. Soc. London, vol. 24, 1864, p. 472.—Carter, Ann. Mag. Nat. Hist., ser. 4, vol. 19, 1877, pl. 13, figs. 26–29.

Lituola nautiloidea, var. *canariensis* Parker and Jones (part), Philos. Trans., vol. 155, 1865, p. 406, pl. 15, figs. 45*a*, *b;* pl. 17, figs. 92–95.

Haplophragmium canariensis Siddall, Cat. Rec. British Foram., 1879, p. 4.—Bütschli, in Bronn's Klassen und Ordnungen des Thierreichs, vol. 1, 1880, p. 192, pl. 5, fig. 17.—H. B. Brady, Denkschr. Akad. Wiss. Wien, vol. 42, 1881, p. 99; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 310, pl. 35, figs. 1–5.—Haeusler, Neues Jahrb., vol. 4, 1885, p. 12, pl. 1, figs. 17–20.—H. B. Brady, Parker, and Jones, Trans. Zool. Soc., vol. 12, 1888, p. 218, pl. 41, fig. 9.—Balkwill and Wright, Trans. Roy. Irish Acad., vol. 28, 1888, p. 330.—Hauesler, Abh. Schweiz. Pal. Ges., vol. 17, 1890, p. 34, pl. 4, figs. 1–3.—J. Wright, Proc. Roy. Irish Acad., ser. 3, vol. 1, 1891, p. 468.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 261, pl. 5, figs. 27–29.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 20, pl. 5, figs. 92–101.—Chapman, Ann. Mag. Nat. Hist., ser. 6, vol. 16, 1895, p. 314, pl. 11, fig. 5 (?); Proc. Zool. Soc. London, 1895, p. 16.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 30.—Millett, Journ. Roy. Micr. Soc., 1899, p. 359.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 277, pl. 20, fig. 3.—Earland, Journ. Quekett Micr. Club, ser. 2, vol. 9, 1905, p. 200.—Sidebottom, Mem. Proc. Manchester Lit. and Philos. Soc., vol. 49, pt. 2, No. 5, 1905, p. 4.—Chapman, Trans. New Zealand Inst., vol. 38, 1905 (1906), p. 84; Journ. Quekett Micr. Club, vol. 10, 1907, p. 126, pl. 9, fig. 3.—Bagg, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 126.—Heron-Allen and Earland, Journ. Roy. Micr. Soc., 1909, p, 323.—Awerinzew, Mem. Acad. Imp. Sci. St. Petersbourg, ser. 8, vol. 29, No. 3, 1911, p. 20.—Bagg, Bull. 513, U. S. Geol. Surv., 1912, p. 33, pl. 7, figs. 1*a–h*.—Heron-Allen and Earland, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 45, pl. 3, fig. 5.—Chapman, Zool. Results "Endeavour," vol. 1, pt. 3, 1915, p. 311.—Heron-Allen and Earland, Trans. Zool. Soc. London, vol. 20, 1915, p. 614; Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 223, pl. 40, figs. 12, 13.

Haplophragmoides canariensis Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 101, fig. 149.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1008.

Nonionina jeffreysii Williamson, Rec. Foram. Great Britain, 1858, p. 34, pl. 3, figs. 72, 73.

Haplophragmium jeffreysii Berthelin, Foram. de Bourgneuf et Pornichet, 1878, p. 24, No. 20.

Description.—Test free, planospiral, composed of a few coils partially involute or almost completely so, umbilicate; chambers subglobular, somewhat compressed laterally, six or seven chambers in the final coil, the last chamber somewhat larger than in the preceding ones, sutures indistinct, periphery somewhat lobulated, wall arenaceous, made up of sand grains, but rather smoothly finished, thin; aperture at the base of the last-formed chamber narrow, the

overhanging portion of the wall slightly extended, forming a thin lip; color a grayish brown, the last-formed chamber often more gray than the preceding ones.

Diameter, 0.75–1.5 mm.

Distribution.—This species from the synonymy given above will be at once seen to have been recorded by many writers from widely distant areas. Evidently, from a comparison of figures referred to this species, there is a considerable range in form, size, and general characters or else more than one species is included under this name. The original figure given by d'Orbigny is very close to one species found in comparatively shallow water off our Atlantic coast, and to this the name *H. canariensis* is here restricted. As the other records are based on a loose application of the name, no attempt is here made to straighten out the problem, which can only be accomplished by a study of the actual specimens. However, it may be noted that of Brady's figures plate 35, figure 1, is very close to the material from the western Atlantic.

All seven stations from which material was obtained are between 37° and 40° N. latitude and 71° and 75° W. longitude. I have also found it in shallow-water material off the New England coast in my own dredgings.

Haplophragmoides canariensis—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10294	U.S.N.M.	7	D2003...	37 16 30 N.; 74 20 36 W..	611	.....	.....	Few.
10295	U.S.N.M.	1	D2171...	37 59 30 N.; 73 48 40 W..	444	39.5	gn. m.....	Rare.
10296	U.S.N.M.	3	D2272...	39 38 00 N.; 71 39 45 W..	515	39.1	gn. m.....	Few.
10297	U.S.N.M.	1	D2203...	39 34 15 N.; 71 41 15 W..	705	38.9	gn. m. s.....	Rare.
10298	U.S.N.M.	1	D2204...	39 30 30 N.; 71 44 30 W..	728	39.1	br. m.....	Rare.
10299	U.S.N.M.	1	D2205...	39 35 00 N.; 71 18 45 W..	1,073	38.1	gy. oz.....	Rare.
10300	U.S.N.M.	3	D2581...	39 43 00 N.; 71 34 00 W..	394	.....	gn. m.....	Few.

HAPLOPHRAGMOIDES MAJOR, new species.

Plate 8, fig. 6.

Description.—Test planospiral, involute, umbilicate, composed of about three coils, periphery broadly rounded, slightly lobulate, usually nine chambers in the last coil of adult specimens, sutures distinct; wall coarsely arenaceous, surface fairly smooth, aperture an elongate semicircular slit at the base of the final chamber, the upper portion forming a thin lip; color gray or light brown.

Diameter.—Type specimen (U.S.N.M. No. 10675a) from *Albatross* D2453 in the Gulf of St. Lawrence in 82 fathoms (150 meters). It also occurred south of Newfoundland on the Grand Banks and at four stations south of Marthas Vineyard and Nantucket, all at

depths less than 75 fathoms (137 meters). Specimens occurred at most of these stations in considerable numbers.

This species, which would probably be included by some writers under *H. canariensis*, seems to be distinct from that species as considered here. It is much larger, has a larger number of chambers, is thicker, and more nearly circular in side view. Its range is apparently mostly confined to waters of less than a hundred fathoms in depth. It is closely similar to the specimen figured by Brady in the *Challenger* report (pl. 35, fig. 4).

Haplophragmoides major—material examined.

Cat. No.	Coll. of—	No. of speci-mens.	Station.	Locality.	Depth in fath-oms.	Bot-tom tem-pera-ture.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10671	U.S.N.M.	10+	D2240...	40 27 30 N.; 70 29 00 W..	44	.....	gn. m.....	Common.
10672	U.S.N.M.	1	D2242...	40 15 30 N.; 70 27 00 W..	58	51.4	gn. m.....	Rare.
10673	U.S.N.M.	10+	D2251...	40 22 17 N.; 69 51 30 W..	43	59.9	gn. m. fne. s.	Common.
10674	U.S.N.M.	10+	D2253...	40 34 30 N.; 69 50 45 W..	32	52.9	gy. s. bk. sp.	Common.
10675	U.S.N.M.	10+						
3081	U.S.N.M.	5	D2453...	47 10 00 N.; 51 02 00 W..	82	29.7	gn. m. fne. s .	Common.
3085	U.S.N.M.	1						
10676	U.S.N.M.	4	D2465...	45 35 00 N.; 55 01 00 W..	67	30	bk. gy. s......	Frequent.

HAPLOPHRAGMOIDES EMACIATUM (H. B. Brady).

Plate 8, fig. 4.

Haplophragmium emaciatum H. B. Brady, Rep. Voy. *Challenger*. Zoology, vol. 9, 1884, p. 305, pl. 33, figs. 26–28.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 262, pl. 5, figs. 53, 54.—Chapman, Proc. Zool. Soc. London, 1895, p. 16 (?).—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 276, pl. 19, fig. 5.

Haplophragmium compressum Millett (not *Haplophragmium compressum* Goës), Journ. Roy. Micr. Soc., 1899, p. 359, pl. 5, fig. 8.—Heron-Allen and Earland, Trans. Zool. Soc. London, vol. 20, 1915, p. 613, pl. 46, figs. 20, 21.

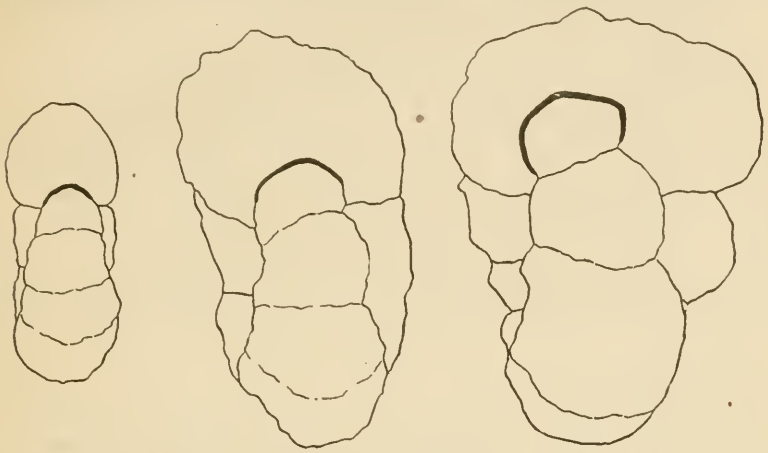
Haplophragmoides emaciatum Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 102, fig. 150–152.

Description.—Test planospiral, composed of three or more coils, not completely involute, compressed in the earlier coils but the last few chambers typically inflated, chambers 7–8 in the last-formed coil, rapidly increasing in breadth in the last-formed portion; wall composed of sand grains with a varying amount of sponge spicules, somewhat roughly finished, interior smooth, the wall especially in the last-formed chamber thick and labyrinthic resembling *Cyclammina* in this respect; aperture a narrow, elongate, somewhat curved slit at the base of the last-formed chamber; color yellowish or reddish brown, occasionally white or gray.

Diameter up to 1.75 mm.

Distribution.—Brady in his original notes on this species says that his best specimens were from *Challenger* station 23, off Sombrero

Island, West Indies, 450 fathoms (823 meters), and 24, off Culebra Island, 390 fathoms (713 meters). Flint records it from the coast of Brazil and from just south of Cuba. I have had an abundance of material, mostly from along our Atlantic coast, from south of



FIGS. 1–3.—HAPLOPHRAGMOIDES EMACIATUM, × 39. APERTURAL VIEWS SHOWING INCREASE IN BREADTH AT VARIOUS STAGES.

Nova Scotia to the Carolina coast, and again at a group of six stations in the northern part of the Gulf of Mexico, with a single station in the Caribbean.

Haplophragmoides emaciatum—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		° F.		
10327	U.S.N.M.	10+	D2003...	37 16 30 N.; 74 20 36 W..	641	.....	.....	Common.
10328	U.S.N.M.	8	D2018...	37 12 22 N.; 74 20 04 W..	788	39	bu. m.....	Frequent.
10329	U.S.N.M.	2	D2072...	41 53 00 N.; 65 35 00 W..	858	39	gy. m.....	Few.
10330	U.S.N.M.	7	D2110...	35 12 10 N.; 74 57 15 W..	516	40	bu. m.....	Frequent.
10331	U.S.N.M.	8	D2111...	35 09 50 N.; 74 57 40 W..	938	.....	gn. m.....	Frequent.
10332	U.S.N.M.	1	D2115...	35 49 30 N.; 74 34 45 W..	843	39	m. fue. s....	Rare.
10333	U.S.N.M.	1	D2150...	13 34 45 N.; 81 21 10 W..	382	45.75	wh. crs. s....	Rare.
10334	U.S.N.M.	10+	D2171...	37 59 30 N.; 73 48 40 W..	444	39.5	gn. m.....	Common.
10335	U.S.N.M.	9	D2189...	39 49 30 N.; 70 26 00 W..	600	39.7	gn. m. s....	Common.
10336	U.S.N.M.	10+	D2202...	39 38 00 N.; 71 39 45 W..	515	39.1	gn. m.....	Common.
10337	U.S.N.M.	10+	D2203...	39 34 15 N.; 71 41 15 W..	705	38.9	gn. m. s....	Common.
10338	U.S.N.M.	7	D2204...	39 30 30 N.; 71 44 30 W..	728	39.1	br. m.....	Frequent.
10339	U.S.N.M.	1	D2219...	39 46 22 N.; 69 29 00 W..	948	38.8	gy. m.....	Rare.
10340	U.S.N.M.	10+	D2234...	39 09 00 N.; 72 03 15 W..	810	38.6	gn. m.....	Common.
10341	U.S.N.M.	3	D2240...	40 27 30 N.; 70 29 00 W..	44	.....	gn. m.....	Few.
10342	U.S.N.M.	1	D2263...	37 08 00 N.; 74 33 00 W..	430	.....	gn. m.....	Rare.
10343	U.S.N.M.	1	D2311...	32 55 00 N.; 77 54 00 W..	79	59.1	crs. s. bk. sp.	Rare.
10344	U.S.N.M.	1	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Rare.
10345	U.S.N.M.	10+	D2377...	29 07 30 N.; 88 08 00 W..	210	67	gy. m.....	Common.
10346	U.S.N.M.	3	D2381...	28 05 00 N.; 87 56 15 W..	1,330	.....	lt. br. m....	Few.
10347	U.S.N.M.	1	D2393...	28 43 00 N.; 87 14 30 W..	525	41.1	lt. gy. m....	Rare.
10348	U.S.N.M.	5	D2394...	28 38 30 N.; 87 02 00 W..	420	41.8	gn. m.....	Few.
10349	U.S.N.M.	4	D2399...	28 44 00 N.; 86 18 00 W..	196	51.6	gy. m.....	Few.
10350	U.S.N.M.	10+	D2547...	39 54 30 N.; 70 20 00 W..	390	39.6	gn. m.....	Common.
10351	U.S.N.M.	7	D2550...	39 44 30 N.; 70 30 45 W..	1,081	38.5	br. m.....	Frequent.
10352	U.S.N.M.	8	D2552...	39 47 07 N.; 70 35 00 W..	721	39.6	gy. oz.....	Frequent.
10353	U.S.N.M.	10+	D2581...	39 43 00 N.; 71 34 00 W..	394	.....	gn. m.....	Common.
10354	U.S.N.M.	5	D2586...	39 02 40 N.; 72 40 00 W..	328	40.2	dk. gy. m...	Frequent.
10355	U.S.N.M.	8	D2689...	39 42 00 N.; 71 15 30 W..	525	.....	gn. m.....	Frequent.
10356	U.S.N.M.	1	D2710...	40 06 00 N.; 68 01 30 W..	984	.....	gn. m.....	Rare.
10357	U.S.N.M.	4	D2739...	37 34 30 N.; 73 58 00 W..	811	38.2	gy. m.....	Few.

HAPLOPHRAGMOIDES SCITULUM (H. B. Brady).

Plate 8, fig. 2.

Haplophragmium scitulum H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 50; Proc. Roy. Soc. Edinburgh, vol. 11, 1882, p. 711; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 308, pl. 34, figs. 11–13.—Chapman, Proc. Zool. Soc. London, 1895, p. 16. Flint, Rep. U. S. Nat. Mus. 1897 (1899), p. 276, pl. 20, fig. 2.

Haplophragmoides scitulum Cushman Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 103, fig. 153–155.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1008.

Description.—Test planospiral, somewhat compressed, excavated in the umbilical region, composed of about three coils, partially involute, periphery broadly rounded, not lobulated; chambers 8–11 in the last-formed coil, broad and low, sutures distinct but only slightly depressed; wall firmly cemented, arenaceous, smoothly finished; aperture a simple curved slit at the base of the final chamber; color of the test various shades of brown, the last formed chamber and sometimes the whole test gray.

Diameter 0.75–1 mm.

Distribution.—There are numerous records for the Atlantic, the *Challenger* obtaining it at several stations from the Faroe Channel to the Cape Verde Islands, thence across to the West Indies, and in the South Atlantic off Buenos Aires (Brady). The *Scotia* obtained it at four stations in the South Atlantic and Antarctic in 1,410–2,500 fathoms (2,579–4,572 meters) (Pearcey). Flint records it from off the northeastern coast of the United States and south of Cuba. From the *Albatross* material I have examined it has been found at 16 stations, 3 in the Gulf of Mexico, where it was rare, and the others off the northeastern coast of the United States. It was not common at any station.

The species seems to be well characterized, the umbilicate form with the truncate inner margins, the regular curve of the test, numerous even chambers nearly flush with one another will serve to identify it.

Haplophragmoides scitulum—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10266	U.S.N.M.	6	D2018...	37 12 22 N.; 74 20 04 W..	788	39	bu. m.....	Few.
10267	U.S.N.M.	1	D2059...	38 19 26 N.; 68 20 20 W..	2,369	.....	glob. oz.....	Rare.
10268	U.S.N.M.	4	D2013...	39 19 00 N.; 68 28 30 W..	1,467	38.5	glob. oz.....	Few.
10525	U.S.N.M.	1	D2052...	39 40 05 N.; 69 21 25 W..	1,098	45	glob. oz.....	Rare.
10269	U.S.N.M.	2	D2160...	23 10 31 N.; 82 20 37 W..	167	.....	co.....	Rare.
10270	U.S.N.M.	3	D2202...	39 38 00 N.; 71 39 45 W..	515	39.1	gn. m.....	Few.
10271	U.S.N.M.	1	D2247...	40 03 00 N.; 69 57 00 W..	78	51.9	gn. m. s.....	Rare.
10272	U.S.N.M.	2	D2394...	28 38 30 N.; 87 02 00 W..	420	41.8	gn. m.....	Rare.
10273	U.S.N.M.	1	D2398...	28 45 00 N.; 86 26 00 W..	227	48.6	gy. m.....	Rare.
10274	U.S.N.M.	1	D2542...	40 00 15 N.; 70 42 20 W..	129	47.2	s. brk. sh....	Rare.
10275	U.S.N.M.	3	D2550...	39 44 30 N.; 70 30 45 W..	1,081	38.5	br. m.....	Few.
10276	U.S.N.M.	1	D2555...	39 53 00 N.; 71 32 00 W..	136	47.7	gn. m. s.....	Rare.
10277	U.S.N.M.	5	D2568...	39 15 00 N.; 68 08 00 W..	1,781	36.9	gy. oz.....	Few.
10278	U.S.N.M.	2	D2581...	39 43 00 N.; 71 34 00 W..	394	.....	gn. m.....	Rare.
10279	U.S.N.M.	1	D2684...	39 35 00 N.; 70 54 00 W..	1,106	.....	br. c. bk. sp..	Rare.
10280	U.S.N.M.	6	D2706...	41 28 30 N.; 65 35 30 W..	1,188	.....	gy. oz. for....	Few.

HAPLOPHRAGMOIDES TRULLISSATA (H. B. Brady).

Plate 9, fig. 5.

Trochammina trullissata H. B. Brady, Quart. Jour. Micr. Sci., vol. 19, 1879, p. 56, pl. 5, figs. 10*a*, *b*, 11; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 342, pl. 40, figs. 14–16 (not fig. 13).—Haeusler, Abh. Schweiz. Pal. Ges., vol. 17, 1890, p. 64, pl. 10, figs. 9, 11.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 265, pl. 5, figs. 25, 26 (?).—Chapman, Proc. Zool. Soc. London, 1895, p. 18.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 33.—Millett, Journ. Roy. Micr. Soc., 1899, p. 364.—Bagg, Bull. 513, U. S. Geol. Surv., 1912, p. 34, pl. 7, figs. 2*a*, *b*.

Haplophragmoides trullissata Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 100, figs. 148*a*, *b*.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1008.

Description.—Test small, planospiral, composed of about three coils, not completely involute, the chambers of earlier coils visible at the center in the umbilical region which is also depressed, periphery slightly lobulated, chambers numerous, 7–9 in the last-formed coil, subglobular, sutures distinct, slightly depressed, wall of fine sand grains with an excess of yellowish or reddish brown cement, smooth and polished; aperture a short narrow slit slightly above the base of the chamber; color yellowish or reddish brown.

Diameter, 0.5–1.25 mm.

Distribution.—This species is very widely distributed in all the ocean basins but is never abundant. More of the stations are in cold water than elsewhere, although the specimens are more common in material from off the southwest of Ireland than at any other station from which I have seen material.

The *Challenger* stations cover the Atlantic well. Goës records it from the Caribbean. It occurs at several stations in cold water off the northeastern United States and at one station in the Gulf of Mexico and two in the Caribbean. The *Scotia* had it from the South Atlantic and Antarctic. The most northerly station is Davis Strait from which the first known specimens were obtained. Egger records it from two *Gazelle* stations off the west coast of Africa, but his figures are difficult to make sure of and it may or may not be this species.

Haplophragmoides trullissata—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10252	U.S.N.M.	1	D2035...	39 26 16 N.; 70 02 37 W..	1,362	.....	glob. oz.....	Rare.
10262	U.S.N.M.	1	D2036...	38 52 40 N.; 69 24 40 W..	1,735	38	glob. oz.....	Rare.
10253	U.S.N.M.	1	D2078...	41 11 30 N.; 66 12 20 W..	499	40	gy. m. and s..	Rare.
10251	U.S.N.M.	8	D2262...	39 54 45 N.; 69 29 45 W..	250	41.6	gn. m. s.....	Few.
10255	U.S.N.M.	1	D2393...	28 43 00 N.; 87 11 30 W..	525	41.1	lt. gy. m....	Rare.
10256	U.S.N.M.	3	D2525...	41 49 00 N.; 65 19 30 W..	72	43.6	s. g. brk. s ..	Rare.
10257	U.S.N.M.	2	D2530...	40 53 30 N.; 66 24 00 W..	956	38.4	gy. oz.....	Rare.
10258	U.S.N.M.	2	D2550...	39 44 30 N.; 70 30 45 W..	1,081	38.5	br. m.....	Rare.
10259	U.S.N.M.	1	D2562...	39 15 30 N.; 71 25 00 W..	1,434	37.3	gy. oz.....	Rare.
10260	U.S.N.M.	1	H43.....	18 01 30 N.; 65 01 10 W..	1,146	.....	co. s. for.....	Rare.
10261	U.S.N.M.	1	H82.....	13 29 00 N.; 62 42 40 W..	1,051	.....	for. m. bk. sp	Rare.

HAPLOPHRAGMOIDES NITIDUM Goës.

Haplophragmium nitidum Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 30, pl. 3, figs. 8, 9.

Description.—Test small, planospiral, subglobular, composed of two or three coils, periphery broadly rounded, somewhat lobulated, last coil composed of four chambers, each of which is broad, but low, either completely involute or leaving a very small but deep umbilicus, wall composed of fine sand grains with much fine reddish-brown cement, the surface neatly finished and with a dull luster; aperture a long, narrow, semicircular slit near but not at the base of the chamber, with a slight lip above and below; color reddish-brown except the last-formed chamber, which may be gray.

Diameter up to 0.5 mm.

Distribution.—Typical specimens are from three *Albatross* stations from the Gulf of Mexico, two in the Caribbean, one off Central America, the other southeast of Puerto Rico, and from two stations off the coast of South Carolina. It was not found at all in the mass of material north of this region. It is a small but very definite species and seems to have a limited range so far as is known.

It is very similar in form to *Pullenia sphaeroides* and is another case of parallelism where two species in entirely different families have evolved the same form of test. The Goës material was recorded from H133 in 533 fathoms (975 meters) in the Caribbean, H419 in 1,356 fathoms (2,480 meters) and D2392 in 724 fathoms (1,324 meters) in the Gulf of Mexico. There are no specimens in the Goës collection returned by him to the U. S. National Museum.

Haplophragmoides nitidum—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10634	U.S.N.M.	1	D2150...	13 34 45 N.; 81 21 10 W..	382	45.75	wh. crs. s....	Rare.
10636	U.S.N.M.	2	D2383...	28 32 00 N.; 88 06 00 W..	1,181	39.8	br. gn. m....	Few.
10637	U.S.N.M.	1	D2392...	28 47 30 N.; 87 27 00 W..	724	40.7	br. gy. m....	Rare.
10638	U.S.N.M.	5	D2393...	28 43 00 N.; 87 14 30 W..	525	41.1	lt. gy. m....	Few.
10639	U.S.N.M.	1	D2678...	32 40 00 N.; 76 40 30 W..	731	38.7	lt. gy. oz....	Rare.
10640	U.S.N.M.	4	D2679...	32 40 00 N.; 76 40 30 W..	782	38.6	lt. gy. oz....	Few.
10641	U.S.N.M.	1	H54.....	17 34 20 N.; 65 25 00 W..	990	.....	co. s. for.....	Rare.

HAPLOPHRAGMOIDES SPHAERILOCULUM Cushman.

Plate 8, fig. 3.

Haplophragmoides sphaeriloculum Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 107, fig. 165.

Description.—Test free, planospiral, consisting of five chambers in the last-formed coil, partially involute, periphery deeply lobulated; chambers inflated, nearly as broad as high, sutures depressed;

wall finely arenaceous, with much cement, surface smooth; aperture a short, narrow slit at the base of the final chamber; color usually yellowish brown.

Diameter up to 1 mm.

Distribution.—This species was originally described from off Japan. Single specimens very evidently of the same species have occurred at six Atlantic stations—four off the northeast coast of the United States, one in the Gulf of Mexico, and the other off the coast of South America.

It can be distinguished by the globose character of the few visible chambers and the smooth wall, giving a globigerine appearance to the test if it were not for the arenaceous character of the wall.

Haplophragmoides sphaeriloculum—*material examined.*

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10289	U.S.N.M.	1	D2048...	40 02 00 N.; 68 50 30 W..	547	29	crs. s. m. and g.	Rare.
10290	U.S.N.M.	1	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Rare.
10291	U.S.N.M.	1	D2192...	39 46 30 N.; 70 14 45 W..	1,060	38.6	gy. oz.....	Rare.
10292	U.S.N.M.	1	D2372...	29 15 30 N.; 85 29 30 W..	27	.....	g.....	Rare.
10520	U.S.N.M.	1	D2570...	39 54 00 N.; 67 05 30 W..	1,813	36.8	glob. oz.....	Rare.
10293	U.S.N.M.	1	D2761...	15 39 00 S.; 38 32 54 W..	818	39	pter. oz.....	Rare.

HAPLOPHRAGMOIDES SUBGLOBOSUM (G. O. Sars).

Plate 8, fig. 5.

Lituola subglobosa M. Sars, Förh. Vid. Selsk. Christiania, 1868 (1869), p. 250 (*nudum nomen*).—G. O. Sars, Förh. Vid. Selsk. Christiania, 1871 (1872), p. 253.

Haplophragmium subglobosum H. B. Brady, Denkschr. Akad. Wiss. Wien, vol. 43, 1881, p. 100; Ann. Mag. Nat. Hist., ser. 5, vol. 8, 1881, p. 406.

Haplophragmium latidorsatum H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 307, pl. 34, figs. 7, 8, 10, 14 (?) (not fig. 9), (not *Nonionina latidorsatum* Bornemann, 1855).—Chapman, Journ. Roy. Micr. Soc., 1892, p. 323, pl. 5, figs. 12*a*, *b*.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 21, pl. 5, figs. 102–123.—Chapman, Proc. Zool. Soc. London, 1895, p. 15.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 29.—Flint, Ann. Rep. U. S. Nat. Mus., 1897 (1899), p. 276, pl. 20, fig. 1.—Millett, Journ. Roy. Micr. Soc., 1899, p. 360.—Heron-Allen and Earland, Journ. Roy. Micr. Soc., 1911, p. 308; Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 46, pl. 2, figs. 15, 16.

Haplophragmoides subglobosum Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 105, figs. 162–164.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1008.

Description.—Test subglobose, usually planospiral, consisting of two or more coils, involute, umbilical region depressed, periphery very slightly if at all lobulated, chambers seven or eight in the last-

formed coil, broad and low, sutures very slightly depressed; wall arenaceous, somewhat roughened, usually smooth within; aperture a more or less elongated, curved slit at the base of the apertural face of the chamber, simple; color gray or brown.

Diameter, 1–2.5 mm.

Distribution.—This species is common in the colder waters of the Atlantic coast, but is less so in the warmer waters of the Gulf of Mexico and Caribbean Sea. The 30 *Challenger* stations in the Atlantic cover the whole area. It is common on the northern and eastern coasts of Europe and known from the colder waters of Franz Josef Land, Spitzbergen, and Baffins Bay. The *Scotia* material from the Antarctic had this species at nine stations as recorded by Pearcey.

The reason for using *H. subglobosa* Sars instead of *H. latidorsatum* Bornemann has been discussed in an earlier paper.[1]

By many writers this specific name has been used to include the species here known as *Cribrostomoides bradyi* so that the distribution of the two should be checked where possible. *Cribrostomoides* may be easily distinguished in the adult by the row of pores forming the aperture while the aperture of *H. subglobosum* is always simple.

The slight departure of the last coil from the true planospiral form is often characteristic.

Haplophragmoides subglobosum—material examined.

Cat. No.	Coll. of-	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10301	U.S.N.M.	10+	D2003	37 16 30 N.; 74 20 36 W.	641	.....	.....	Common.
10302	U.S.N.M.	7	D2037	38 53 00 N.; 69 23 30 W.	1,731	38	glob. oz.	Frequent.
10303	U.S.N.M.	2	D2039	38 19 25 N.; 68 20 20 W.	2,369	.....	glob. oz.	Rare.
10304	U.S.N.M.	2	D2042	39 33 00 N.; 68 26 45 W.	1,555	38.5	glob. oz.	Rare.
10305	U.S.N.M.	2	D2105	37 50 00 N.; 73 03 50 W.	1,395	41	glob. oz.	Rare.
10306	U.S.N.M.	7	D2111	35 09 50 N.; 74 57 40 W.	938	.....	gn. m.	Frequent.
10307	U.S.N.M.	2	D2115	35 49 30 N.; 74 34 45 W.	843	39	m. fne. s.	Rare.
10308	U.S.N.M.	1	D2150	13 34 45 N.; 81 21 10 W.	382	45.75	wh. crs. s.	Rare.
10309	U.S.N.M.	3	D2189	39 49 30 N.; 70 26 00 W.	600	39.7	gn. m. s.	Few.
10310	U.S.N.M.	3	D2202	39 38 00 N.; 71 39 45 W.	515	39.1	gn. m.	Few.
10311	U.S.N.M.	3	D2203	39 34 15 N.; 71 41 15 W.	705	38.9	gn. m. s.	Few.
10312	U.S.N.M.	5	D2204	39 30 30 N.; 71 44 30 W.	728	39.1	br. m.	Few.
10313	U.S.N.M.	1	D2217	39 47 20 N.; 69 34 15 W.	924	38.1	gy. m.	Rare.
10314	U.S.N.M.	1	D2231	38 29 00 N.; 73 09 00 W.	965	36.8	gy. oz.	Rare.
10315	U.S.N.M.	1	D2394	28 38 30 N.; 87 02 00 W.	420	41.8	gn. m.	Rare.
10316	U.S.N.M.	1	D2562	39 15 30 N.; 71 25 00 W.	1,434	37.3	gy. oz.	Rare.
10317	U.S.N.M.	8	D2568	39 15 00 N.; 68 08 00 W.	1,781	36.9	gy. oz.	Few.
10318	U.S.N.M.	4	D2572	40 29 00 N.; 66 04 00 W.	1,769	37.8	gy. oz.	Few.
10319	U.S.N.M.	1	D2581	39 43 00 N.; 71 34 00 W.	394	.....	gn. m.	Rare.
10320	U.S.N.M.	2	D2677	32 39 00 N.; 76 50 30 W.	478	39.3	gn. m.	Rare.
10321	U.S.N.M.	1	D2679	32 40 00 N.; 76 40 30 W.	782	38.6	lt. gy. oz.	Rare.
10322	U.S.N.M.	1	D2682	39 38 00 N.; 70 22 00 W.	1,004	.....	gn. m. s.	Rare.
10323	U.S.N.M.	1	D2689	39 42 00 N.; 71 15 30 W.	525	.....	gn. m.	Rare.
10324	U.S.N.M.	2	D2706	41 28 30 N.; 65 35 30 W.	1,188	.....	gy. oz. for.	Rare.
10325	U.S.N.M.	1	H179	14 20 30 N.; 63 10 00 W.	821	.....	co. s. sh. for.	Few.
10326	U.S.N.M.	2	H185	12 58 40 N.; 62 48 00 W.	1,635	.....	bu. m. for. bk. sp.	Rare.

[1] Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 106.

HAPLOPHRAGMOIDES ROTULATUM (H. B. Brady).

Plate 9, figs. 3 and 4.

Haplophragmium rotulatum H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 50; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 306, pl. 34, figs. 5, 6.—Chapman, Proc. Zool. Soc. London, 1895, p. 16.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 261, pl. 5, figs. 43, 44.

Haplophragmoides rotulatum Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 104, figs. 156–7.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1008.

Description.—Test planospiral, partially involute, composed of about three coils, biconcave, periphery thick, squarely or obliquely truncate, earlier coils somewhat exposed in the umbilical region; chambers numerous, about nine in the final coil, broad and low, not well defined from the exterior, sutures indistinct; wall fairly thick, roughened, composed of coarse sand grains; aperture a narrow slit at the base of the final chamber; color brown.

Diameter, 0.56–0.75 mm.

Distribution.—Brady gives several *Challenger* stations for this species in various parts of the Atlantic at depths ranging from 1,000 to 3,150 fathoms (1,829 to 5,761 meters). Pearcey records it from two *Scotia* stations in the South Atlantic in 1,946 and 2,110 fathoms (3,559 and 3,859 meters). I have had single specimens referable to this species, one from D2140, in 966 fathoms (1,767 meters) south of Jamaica, the other, D2761, in 818 fathoms (1,483 meters) off Brazil.

Haplophragmoides rotulatum—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10787	U.S.N.M.	1	D2140...	17 36 10 N.; 76 46 05 W..	966	39.7	s.....	Rare.
10788	U.S.N.M.	1	D2761...	15 39 00 S.; 38 32 54 W..	818	39	pter. oz.....	Rare.

HAPLOPHRAGMOIDES GLOMERATUM (H. B. Brady).

Plate 9, fig. 6.

Lituola glomerata H. B. Brady, Ann. Mag. Nat. Hist., ser. 5, vol. 1, 1878, p. 433, pl. 20, figs. 1*a–c*.

Haplophragmium glomeratum Wright, Proc. Belfast Field Club, 1880–81 (App.), p. 180, pl. 8, figs. 1, 1*a*.—H. B. Brady, Denkschr. Akad. Wiss. Wien, vol. 43, 1881, p. 100; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 309, pl. 34, figs. 15–18.—Balkwill and Millett, Journ. Micr., vol. 3, 1884, p. 25, pl. 1, fig. 6.—Balkwill and Wright, Trans. Roy. Irish Acad., vol. 28, 1885, p. 329.—J. Wright, Proc. Roy. Irish Acad., ser. 3, vol. 1, 1891, p. 468.—Chapman, Journ. Roy. Micr. Soc., 1892, p. 321, pl. 5, fig. 8.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 23, pl. 5, figs. 134–136 (not figs. 137–139).—Chapman, Proc. Zool. Soc. London, 1895, p. 15.—Heron-Allen and Earland, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 46, pl. 2, fig. 14; Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 225.

Haplophragmoides glomeratum Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 104, figs. 158–161.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1008.

Description.—Test small, planospiral, subglobose, composed of about two coils, chambers few, three or four in the last-formed coil, slightly concave at the umbilical region, very broad and low; wall coarsely arenaceous, thin, roughened on the exterior; aperture a short slit at the base of the chamber, often obscured by sand grains; color variable, depending largely upon the material of the test.

Diameter, 0.25–0.75 mm.

Distribution.—From published records this is a common species, yet I have failed to find it in material from the western Atlantic, nor is it recorded by Goës or Flint from the same region. The Atlantic records include Baffins Bay, Smith Sound, and Franz Josef Land at the north, off the coasts of Scotland and Ireland, and at numerous *Challenger* Atlantic stations, one of which at least is in the area from which many of the *Albatross* stations are located. Pearcey records it from the Antarctic.

HAPLOPHRAGMOIDES RUNIANUM (Heron-Allen and Earland).

Plate 10, figs. 1 and 2.

Haplophragmium runianum Heron-Allen and Earland, Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 224, pl. 40, figs. 15–18.

Description.—"Test free, nautiloid, more or less depressed at the umbilicus, constructed of rather coarse sand grains and gray cement. As a rule, no septation visible externally. In large specimens an occasional constriction indicates the presence of a suture. Marginal edge thick and rounded. Aperture simple, ranging between a fissure and a constricted terminal opening of irregular form. Viewed as an object in balsam, the multilocular character of the test becomes apparent; it is then seen to consist of three to four convolutions divided into numerous chambers (13 or 14 in the last convolution) by septal walls that are usually very thin in comparison with the thick outer wall of the test. The chambers are almost square in section."

"Diameter, 0.5–0.7 mm.; width of final convolution, 0.1; breadth of each chamber in final convolution, 0.1."

Distribution.—This species was described by the authors from a single station of the *Runa* from Scresort Bay, Rhum, off the west of Scotland, in 3 fathoms (5.5 meters).

The description and figures are from Heron-Allen and Earland.

HAPLOPHRAGMOIDES CORONATA (H. B. Brady).

Plate 9, fig. 1.

Trochammina coronata H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 58, pl. 5, fig. 15; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 340, pl. 40, figs. 10–12.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 281, pl. 26, fig. 3.

Haplophragmoides coronata Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 99, fig. 145–47.

Description.—Test planospiral, composed of three to six coils, outer ones somewhat embracing but not covering the whole of the

previous coil; chambers usually six or seven in the last-formed coil, inflated, short, periphery lobulated, sutures depressed and distinct; wall arenaceous, composed of fine sand and a yellowish or reddish-brown cement; aperture simple, at the ventral border of the apertural face, sometimes with traces of a slightly developed lip; color usually yellowish or reddish brown, occasionally white.

Diameter, up to 2.5 mm.

Distribution.—This is a rare species, apparently with a definite distribution. The *Challenger* stations are three in number, 23 in 450 fathoms (823 meters) off Sombrero Island and 24 in 390 fathoms (713 meters) off Culebra Island, West Indies, and 120 in 675 fathoms (1,234 meters) off Pernambuco, Brazil. Flint records it from *Albatross* station D2395 in 347 fathoms (635 meters) in the northern part of the Gulf of Mexico, and his material which I have examined is typical. In the *Albatross* material I have had it has occurred at five stations, one off Central America, D2150, two in the eastern Caribbean, D2751 and H79 not far from the two *Challenger* stations and at two stations off Brazil, D2760 and D2761, slightly southward along the coast from the *Challenger* stations. This is very similar to the distribution of *Ammodiscoides turbinatus* and other species. It is apparently a definite faunal area for species in depths of 400–1,000 fathoms (732–1,829 meters) or a somewhat wider bathymetrical range. This is a large and striking species, well illustrated by Brady and by Flint and if it had a wider distribution it certainly would have been recorded elsewhere.

Haplophragmoides coronata—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		° F.		
10281	U.S.N.M.	1	D2150...	13 34 45 N.; 81 21 10 W..	382	45.75	wh. crs. s....	Rare.
10282	U.S.N.M.	7	D2751...	16 54 00 N.; 63 12 00 W..	687	40	bu. glob. oz..	Frequent.
10283	U.S.N.M.	3	D2760...	12 07 00 S.; 37 17 00 W..	1,019	39.5	br. co.?.....	Few.
10285	U.S.N.M.	1	D2761...	15 39 00 S.; 38 32 54 W...	818	39	pter. oz.....	Rare.
10286	U.S.N.M.	1	H79.....	14 20 30 N.; 63 10 00 W..	821	.....	co. s. sh. for.	Rare.

HAPLOPHRAGMOIDES RINGENS (H. B. Brady).

Plate 9, fig. 2.

Trochammina ringens H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 57, pl. 5, figs. 12*a*, *b*; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 343, pl. 40, figs. 17, 18.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 33.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 281, pl. 27, fig. 1.—Millett, Journ. Roy. Micr. Soc., 1899, p. 365, pl. 5, fig. 14 (?).—Bagg, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 129.

Ammochilostoma ringens Eimer and Fickert, Zeitschr. Wiss. Zool., vol. 65, 1899, p. 692.

Haplophragmoides ringens Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 107, fig. 166.

Description.—Test planospiral, of few coils, completely involute, compressed, periphery acute or very slightly rounded, somewhat lobulated; chambers distinct, few in number, three to five in the last-formed coil, the last in adults occasionally assuming peculiar forms, high, biconvex, sutures clearly marked but not greatly excavated; wall thin, of fine sand grains with an abundance of cement, smooth and polished; aperture an elongate, nearly straight, narrow slit, somewhat above the base of the chamber and usually in a slight depression; color a yellowish or reddish brown.

Diameter, up to 2.2 mm.

Distribution.—While this species has a wide distribution it is usually found in deep cold waters and usually is rare. In the Atlantic it has been found as far north as Davis Strait (Norman) and from several *Challenger* stations in the deeper Atlantic (Brady). Goës records it from the Gulf of Mexico and south of Cuba. Flint's specimens were from the northeastern coast of the United States and from the northern part of the Gulf of Mexico. From the *Albatross* material I have had *H. ringens* from 18 stations, mostly in deep water between 37° and 40° N. latitude, and 68° and 73° W. longitude. Five stations are in the northern part of the Gulf of Mexico and one from the eastern Caribbean.

The species is a very well marked one and can hardly be confused with any other. Its color, polished surface, general biconvex shape and especially in addition to these the peculiar aperture will distinguish it. The last-formed chamber in adults may be variously shaped as is shown in the figures. On the interior there is often a decidedly lipped condition about the aperture due to the bending in of the walls.

Haplophragmoides ringens—*material examined.*

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
						°F.		
10263	U.S.N.M.	1	D2036...	38 52 10 N.; 69 24 43 W..	1,735	38	glob. oz.....	Rare.
10235	U.S.N.M.	6	D2038...	38 30 30 N.; 69 08 25 W..	2,033	.....	glob. oz.....	Few.
10236	U.S.N.M.	5	D2039...	38 19 26 N.; 68 20 20 W..	2,369	.....	glob. oz.....	Few.
10237	U.S.N.M.	7	D2041...	39 22 50 N.; 68 25 00 W..	1,608	38	glob. oz.....	Few.
10238	U.S.N.M.	10+	D2012...	39 33 00 N.; 68 26 45 W..	1,555	38.5	glob. oz.....	Common.
10239	U.S.N.M.	10+	D2043...	39 49 00 N.; 68 28 30 W..	1,467	38.5	glob. oz.....	Common.
10240	U.S.N.M.	1	D2046...	40 02 49 N.; 68 49 00 W..	407	40	bu. m.....	Rare.
10241	U.S.N.M.	2	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Rare.
10242	U.S.N.M.	1	D2221...	39 05 30 N.; 70 44 30 W..	1,525	36.9	gy. oz.....	Rare.
10243	U.S.N.M.	1	D2226...	37 00 00 N.; 71 54 00 W..	2,045	36.8	glob. oz.....	Rare.
10244	U.S.N.M.	4	D2228...	37 25 00 N.; 73 06 00 W..	1,582	36.8	br. m.....	Few.
10245	U.S.N.M.	1	D2372...	29 15 30 N.; 85 29 30 W..	27	.....	g.....	Rare.
10246	U.S.N.M.	10+	D2383...	28 32 00 N.; 88 06 00 W..	1,181	39.8	br. gn. m....	Common.
10247	U.S.N.M.	5	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Few.
10248	U.S.N.M.	2	D2392...	28 47 30 N.; 87 27 00 W..	724	40.7	lr. gy. m....	Rare.
10249	U.S.N.M.	1	D2393...	28 43 00 N.; 87 14 30 W..	525	41.1	lt. gy. m....	Rare.
10250	U.S.N.M.	2	D2568...	39 15 00 N.; 68 08 00 W..	1,781	36.9	gy. oz.....	Rare.
10251	U.S.N.M.	1	H79.....	14 20 30 N.; 63 10 00 W..	821	.....	co. s.sh. for..	Rare.

Genus CRIBROSTOMOIDES Cushman, 1910.

Haplophragmium H. B. Brady (part), Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 307.

Cribrostomoides Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 108, fig. 167*a*, *b*. (Type, *Cribrostomoides bradyi* Cushman).

Description.—Test free, planospiral, composed of numerous chambers in several coils, the last-formed coil with several chambers progressively increasing in size, wall arenaceous, with much cement usually of a light brown color, aperture in young specimens a simple elongate slit at the base of the apertural face, later subdivided by tooth-like processes, and in the adult represented by a linear series of distinct rounded openings.

This genus, while in general character is similar to *Haplophragmoides*, differs very distinctly in the apertural characters and in their development.

CRIBROSTOMOIDES BRADYI Cushman.

Plate 10, fig. 3.

Haplophragmium latidorsatum H. B. Brady (part) (not Bornemann), Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 307, pl. 34, fig. 9.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 29 (part).

Cribrostomoides bradyi Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 108, figs. 167*a*, *b*.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1009.

Description.—Test large, planospiral, or the last-formed coil slightly oblique; periphery broadly rounded, very slightly if at all lobulated, usually completely involute, umbilicate, chambers numerous, seven to nine in the last-formed coil, low and broad, sutures distinct; wall arenaceous, smoothly finished, aperture in the young a simple slit at the base of the chamber, in later stages becoming interrupted by ingrowing, tooth-like projections which later meet and form a linear series of rounded openings in the adult; color grayish or yellowish brown.

Diameter, up to 3 mm.

Distribution.—As this genus and species was not segregated until 1910, its distribution largely depends upon records from that time. It has been recorded from the Pacific in various areas (Cushman) and from the South Atlantic and Antarctic (Pearcey). In the *Albatross* material it occurs off the northeastern United States at many stations in cold water and at a few in the Gulf of Mexico and Caribbean. Specimens were noted in one lot of *Goldseeker* material from off the British Isles. Adult specimens are easily distinguished, and younger specimens have the peculiar aperture and smooth exterior.

Cribrostomoides bradyi—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10358	U.S.N.M.	8	D2018...	37 12 22 N.; 74 20 04 W..	788	39	bn. m.....	Frequent.
10359	U.S.N.M.	10+	D2035...	39 26 16 N.; 70 02 37 W..	1,362	.....	glob. oz.....	Common.
10360	U.S.N.M.	3	D2036...	38 52 40 N.; 69 24 40 W..	1,735	38	glob. oz.....	Few.
10361	U.S.N.M.	8	D2037...	38 53 00 N.; 69 23 30 W..	1,731	38	glob. oz.....	Frequent.
10362	U.S.N.M.	10+	D2038...	38 39 30 N.; 69 08 25 W..	2,033	.....	glob. oz.....	Common.
10363	U.S.N.M.	10+	D2039...	38 19 26 N.; 68 20 20 W..	2,309	.....	glob. oz.....	Common.
10364	U.S.N.M.	10+	D2041...	39 22 50 N.; 68 25 00 W..	1,608	38	glob. oz.....	Common.
10365	U.S.N.M.	6	D2042...	39 33 00 N.; 68 26 45 W..	1,555	38.5	glob. oz.....	Few.
10366	U.S.N.M.	10	D2043...	39 49 09 N.; 68 28 30 W..	1,407	38.5	glob. oz.....	Frequent.
10367	U.S.N.M.	2	D2046...	40 02 49 N.; 68 49 00 W..	407	40	bn. m.....	Few.
10368	U.S.N.M.	1	D2096...	39 22 20 N.; 70 52 20 W..	1,451	37.5	glob. oz.....	Rare.
10369	U.S.N.M.	3	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Few.
10370	U.S.N.M.	1	D2105...	37 50 00 N.; 73 03 50 W..	1,395	41	glob. oz.....	Rare.
3101	U.S.N.M.	1	D2171...	38 15 00 N.; 72 03 00 W..	1,594	.....	gy. m.....	Rare.
10371	U.S.N.M.	9	D2221...	39 05 30 N.; 70 44 30 W..	1,525	36.9	gy. oz.....	Frequent.
10372	U.S.N.M.	1	D2222...	39 03 15 N.; 70 50 45 W..	1,537	36.9	gy. oz.....	Rare.
10373	U.S.N.M.	5	D2226...	37 00 00 N.; 71 54 00 W..	2,045	36.8	glob. oz.....	Few.
10374	U.S.N.M.	1	D2228...	37 25 00 N.; 73 06 00 W..	1,582	36.8	br. m.....	Rare.
10375	U.S.N.M.	10+	D2377...	29 07 30 N.; 88 08 00 W..	210	67	gy. m.....	Common.
10376	U.S.N.M.	1	D2381...	28 05 00 N.; 87 56 15 W..	1,330	.....	lt. br. m....	Rare.
10377	U.S.N.M.	10+	D2383...	28 32 00 N.; 88 06 00 W..	1,181	39.8	br. gn. m. ..	Common.
10378	U.S.N.M.	10+	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Common.
10379	U.S.N.M.	3	D2399...	28 44 00 N.; 86 18 00 W..	196	51.6	gy. m.....	Few.
10380	U.S.N.M.	2	D2505...	44 23 30 N.; 61 44 15 W..	93	42.3	dk. br. m...	Few.
10381	U.S.N.M.	1	D2550...	39 44 30 N.; 70 30 45 W..	1,081	38.5	br. m.....	Rare.
10382	U.S.N.M.	6	D2562...	39 15 30 N.; 71 25 00 W..	1,434	37.3	gy. oz.....	Few.
10383	U.S.N.M.	10+	D2572...	40 29 00 N.; 66 04 00 W..	1,709	37.8	gy. oz.....	Common.
10384	U.S.N.M.	1	D2716...	38 29 30 N.; 70 57 00 W..	1,031	.....	br. oz. for...	Rare.
10385	U.S.N.M.	3	D2751...	16 54 00 N.; 63 12 00 W..	687	40	bn. glob. oz.	Rare.
10386	U.S.N.M.	10+	*Gold-seeker.*	81 03 00 N.; 2 20 00 W...	.....	.....	.....	

Genus CYCLAMMINA H. B. Brady, 1876.

Lituola W. B. Carpenter (part), The Microscope, ed. 5, 1875, p. 536.—Carter, Ann. Mag. Nat. Hist., ser. 4, vol. 19, 1877, p. 203.

Cyclammina H. B. Brady (MS.) in Norman, Proc. Roy. Soc., vol. 25, 1876, p. 214 (Type, *Cyclammina cancellata* H. B. Brady); Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 350.—Chapman, The Foraminifera, 1902, p. 158.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 109.

Description.—Test free, planospiral, composed of numerous chambers in a close-coiled nautiloid series, final volution usually embracing the preceding ones except at the umbilicus; walls thick, composed of fine arenaceous material with a large amount of reddish-brown cement, exterior smooth, chambers with secondary labyrinthic structures interiorly, especially on the peripheral portion of each chamber, early chambers often becoming completely filled by this secondary growth; aperture a curved fissure at the proximal portion of the apertural face, supplemented by numerous pores in the central portion of the apertural wall.

CYCLAMMINA CANCELLATA H. B. Brady.

Plate 10, figs. 4 and 5.

"Nautiloid *Lituola*" W. B. Carpenter, The Microscope, ed. 5, 1875, p. 536, figs. 274*a*, *b*, *c* (in text).

Cyclammina cancellata H. B. Brady (MS.) in Norman, Proc. Roy. Soc., vol. 25, 1876, p. 214; Quart. Journ. Micr. Sci., vol. 19, 1879, p. 62; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 351, pl. 37, figs. 8–16.—Agassiz, Bull. Mus. Comp. Zoöl., vol. 29, 1888, p. 164, figs. 498, 499 (in text). J. Wright, Proc. Roy. Irish Acad., ser. 3, vol. 1, 1891, p. 470.—Chapman, Proc. Zool. Soc. London, 1895, p. 18.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 32.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 282, pl. 27, fig. 3; pl. 28, fig. 1.—Chapman, The Foraminifera, 1902, p. 158, pl. 8, figs. *N*, *n*.—Bagg, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 129.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 110, figs. 168–171.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1009.

Lituola canariensis Carter, Ann. Mag. Nat. Hist., ser. 4, vol. 19, 1877, p. 203, pl. 13, figs. 26–29.

Description. Test large, compressed, planospiral, composed of two or three coils, periphery broadly rounded, smooth or very slightly lobulated, somewhat depressed in the umbilical region; chambers numerous, usually fifteen or more in the last-formed coil, sutures distinct, but not depressed, sigmoid, interior labyrinthic, especially the peripheral portion, the interior of each chamber having a larger cavity; wall arenaceous, with an excess of yellowish or reddish brown cement often with fairly large angular sand grains but these smoothly finished into the surface which has often a dull gloss; aperture an elongated curved slit at the base of the chamber with supplementary circular pores in the face of the chamber, variously arranged, often numerous in the larger specimens; color yellowish or reddish-brown or gray.

Diameter up to 6.5 mm.

Distribution.—This is a widely distributed species. The various species previously included under this name have been separated and need data of their distribution. In the *Albatross* material *C. cancellata* occurs abundantly off the eastern coast of the United States, in the Gulf of Mexico, Caribbean Sea, and off the coast of Brazil. All but two of the twenty-nine stations are in less than 1,000 fathoms (1,829 meters) and the other two are not greatly in excess of this depth. This is not necessarily significant except that the two allied species *C. compressa* and *C. pauciloculata* occur at greater average depths in the same general area.

C. cancellata may be distinguished from the others by its larger size but especially by its broadly rounded periphery with numerous chambers, usually fifteen or more in the last-formed coil.

Cyclammina cancellata—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		° F.		
10435	U.S.N.M.	1	D2150...	13 34 45 N.; 81 21 10 W..	382	45.75	wh. crs. s....	Rare.
10436	U.S.N.M.	1	D2172...	38 01 15 N.; 73 44 00 W..	568	39	gn. m.....	Rare.
10437	U.S.N.M.	5	D2202...	39 38 00 N.; 71 39 45 W..	515	39.1	gn. m.....	Few.
10438	U.S.N.M.	6	D2203...	39 34 15 N.; 71 45 15 W..	705	38.9	gn. m. s.....	Few.
10439	U.S.N.M.	2	D2204...	39 30 30 N.; 71 44 30 W..	728	39.1	br. m.....	Rare.
10440	U.S.N.M.	3	D2212...	39 59 30 N.; 70 30 45 W..	428	40	gn. m.....	Few.
10441	U.S.N.M.	5	D2213...	39 58 30 N.; 70 30 00 W..	384	39.5	gn. m.....	Few.
10442	U.S.N.M.	10+	D2234...	39 09 00 N.; 72 03 15 W..	810	38.6	gn. m.....	Common.
10443	U.S.N.M.	5	D2237...	39 12 17 N.; 72 09 30 W..	520	39.5	gn. m.....	Few.
10444	U.S.N.M.	1	D2314...	32 43 00 N.; 77 51 00 W..	159	47.4	crs. s. brk. sh	Rare.
10445	U.S.N.M.	1	D2355...	20 56 48 N.; 86 27 00 W..	399	.....	yl. oz.....	Rare.
10446	U.S.N.M.	10+	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Common.
10447	U.S.N.M.	2	D2392...	28 47 30 N.; 87 27 00 W..	724	40.7	br. gy. m....	Rare.
10448	U.S.N.M.	3	D2394...	28 38 30 N.; 87 02 00 W..	420	41.8	gn. m.....	Rare.
10449	U.S.N.M.	2	D2395...	28 36 15 N.; 86 50 00 W..	347	44.1	gy m.....	Rare.
10450	U.S.N.M.	4	D2504...	44 23 00 N.; 61 22 45 W..	82	40.6	bk. m. g....	Few.
10451	U.S.N.M.	10+	D2677...	32 39 00 N.; 76 50 30 W..	478	39.3	gn. m.....	Common.
10452	U.S.N.M.	3	D2678...	32 40 00 N.; 76 40 30 W..	731	38.7	lt. gy. oz....	Few.
10453	U.S.N.M.	6	D2679...	32 40 00 N.; 76 40 30 W..	782	38.6	lt. gy. oz....	Few.
10454	U.S.N.M.	3	D2680...	39 50 00 N.; 70 26 00 W..	555	.....	.....	Few.
10455	U.S.N.M.	10+	D2689...	39 42 00 N.; 71 15 30 W..	525	.....	gn. m.....	Common.
10456	U.S.N.M.	1	D2729...	36 36 00 N.; 74 32 00 W..	679	.....	dk. gn. m...	Rare.
10457	U.S.N.M.	2	D2731...	36 45 00 N.; 74 28 00 W..	781	.....	gy. oz.....	Rare.
10458	U.S.N.M.	10+	D2739...	37 34 30 N.; 73 58 00 W..	811	38.2	gy. m.....	Common.
10459	U.S.N.M.	10	D2751...	16 54 00 N.; 63 12 00 W..	687	40	bu. glob. oz.	Common.
10460	U.S.N.M.	10+	D2760...	12 07 00 S.; 37 17 00 W..	1,019	39.5	br. co.....	Common.
10461	U.S.N.M.	1	D2761...	15 39 00 S.; 38 32 54 W..	818	39	pter. oz.....	Rare.
10462	U.S.N.M.	1	H58.....	17 45 20 N.; 65 35 35 W..	1,345	.....	oz for.....	Rare.
10463	U.S.N.M.	1	H405....	18 43 00 N.; 83 36 45 W..	735	.....	yl.oz.for,pter	Rare.

CYCLAMMINA COMPRESSA Cushman.

Plate 11, fig. 1.

Cyclammina cancellata (part) CUSHMAN, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 111, fig. 171 (not figures 168–170).

Cyclammina compressa CUSHMAN, Proc. U. S. Nat. Mus., vol. 51, 1917, p. 653.

Description.—Test nautiloid, biconvex, compressed, peripheral margin subacute, umbilicus often notably excavated; chambers numerous, 14–16 in the last-formed coil, usually 15; sutures subangular in the middle in side view, clearly depressed; surface smooth when perfect; aperture and color as in *C. cancellata*.

Diameter, up to 3.5 mm.

Distribution.—This species, originally described from 560 fathoms off the Philippines, seems, like other species of the genus, to be widely distributed. Specimens have occurred at numerous stations in the region from Cape Hatteras northward to the Georges Banks with a few stations in the eastern portion of the Caribbean Sea. The range in depth is from 328 to 1,635 fathoms (600–2,990 meters) and bottom temperatures where given 36.9° to 40.2° F. (2.7 to 4.5° C.). The stations at which it occurred in considerable numbers are between 500 and 1,000 fathoms (914 and 1,829 meters).

This seems to be easily distinguished from typical *C. cancellata*, as its shape, periphery, umbilicate region, with exposed previous coils, are very distinct from that species. Its nearest related species is the much smaller *C. pusilla* but that is very much smaller.

Cyclammina compressa—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
						° F.		
10387	U.S.N.M.	10+	D2110...	35 12 10 N.; 74 57 15 W..	516	40	bu. m.....	Common.
10388	U.S.N.M.	10+	D2111...	35 09 50 N.; 74 57 40 W..	938	.....	gn. m.....	Common.
10389	U.S.N.M.	10+	D2115...	35 49 30 N.; 74 34 45 W..	843	39	m. fne. s....	Common.
10390	U.S.N.M.	1	D2187...	39 49 30 N.; 71 10 00 W..	420	39.7	gn. m. s.....	Rare.
10391	U.S.N.M.	10+	D2189...	39 49 30 N.; 70 26 00 W..	600	39.7	gn. m. s.....	Common.
10392	U.S.N.M.	10+	D2202...	39 38 00 N.; 71 39 45 W..	515	39.1	gn. m.....	Common.
10393	U.S.N.M.	10+	D2203...	39 34 15 N.; 71 45 15 W..	705	38.9	gn. m. s.....	Common.
10394	U.S.N.M.	10+	D2204...	39 30 30 N.; 71 44 30 W..	728	39.1	br. m.....	Common.
10395	U.S.N.M.	4	D2213...	39 58 30 N.; 70 30 00 W..	384	39.5	gn. m.....	Few.
10396	U.S.N.M.	2	D2221...	39 05 30 N.; 70 44 30 W..	1,525	36.9	gy. oz.....	Rare.
10397	U.S.N.M.	1	D2531...	40 42 00 N.; 66 33 00 W..	852	38.4	gy. m.....	Rare.
10398	U.S.N.M.	1	D2562...	39 15 30 N.; 71 25 00 W..	1,434	37.3	gy. oz.....	Rare.
10399	U.S.N.M.	1	D2584...	39 05 30 N.; 72 23 20 W..	541	39.5	gy. m.....	Rare.
10400	U.S.N.M.	2	D2586...	39 02 40 N.; 72 40 00 W..	328	40.2	dk. gy. m....	Rare.
10401	U.S.N.M.	2	D2682...	39 38 00 N.; 70 22 00 W..	1,004	.....	gn. m. s.....	Rare.
10402	U.S.N.M.	4	D2706...	41 28 30 N.; 65 35 30 W..	1,188	.....	gy. oz. for...	Few.
10403	U.S.N.M.	4	D2710...	40 06 00 N.; 68 01 30 W..	984	.....	gn. m.....	Few.
10404	U.S.N.M.	1	H79.....	14 20 30 N.; 63 10 00 W..	821	.....	co. s. sh. for.	Rare.
10405	U.S.N.M.	3	H80.....	13 56 35 N.; 63 02 00 W..	684	.....	gy. m for..	Rare.
10406	U.S.N.M.	2	H86.....	12 58 40 N.; 62 48 00 W..	1,635	.....	bu. m. for. bk. sp.	Rare.

CYCLAMMINA PAUCILOCULATA Cushman.

Plate 11, fig. 2.

Cyclammina pauciloculata CUSHMAN, Proc. U. S. Nat. Mus., vol. 51, 1917, p. 653.

Description.—Test compressed, nautiloid, biconvex, peripheral margin bluntly rounded, umbilical region depressed, chambers typically ten to eleven in the last-formed coil, sutures nearly straight to somewhat curved; surface smooth when perfect; supplementary apertural pores few in number.

Diameter, up to 2.5 mm.

Distribution.—This species is widely distributed. Originally described from the Philippine region where it is widely distributed, especially in the deeper cooler waters it has been found in considerable numbers in the western Atlantic. Specimens are numerous from the northeastern coast of the United States, from the Gulf of Mexico, and less common from the Caribbean Sea.

This species holds a somewhat intermediate position between *C. cancellata* and *C. compressa* and is easily distinguished from either by the smaller size and smaller number of chambers in the last-formed coil at any stage of development.

Cyclammina pauciloculata—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10407	U.S.N.M.	10+	D2003.....	37 16 30 N.; 74 20 36 W..	641	.....	.....	Common.
10408	U.S.N.M.	10+	D2018.....	37 12 22 N.; 74 20 04 W..	788	39	bu. m.....	Common.
10409	U.S.N.M.	1	D2035.....	39 26 16 N.; 70 02 37 W..	1,362	.....	glob. oz.....	Rare.
10430	U.S.N.M.	1	D2041.....	39 22 50 N.; 68 25 00 W..	1,608	38	glob. oz.....	Rare.
10410	U.S.N.M.	3	D2043.....	39 49 00 N.; 68 28 30 W..	1,467	38.5	glob. oz.....	Rare.
10411	U.S.N.M.	1	D2046.....	40 02 49 N.; 68 49 00 W..	407	40	bu. m.....	Rare.
10412	U.S.N.M.	1	D2048.....	40 02 00 N.; 68 50 30 W..	547	29	crs. s. m. & g.	Rare.
10413	U.S.N.M.	2	D2052.....	39 40 05 N.; 69 21 25 W..	1,098	45	glob. oz.....	Rare.
10414	U.S.N.M.	10+	D2150.....	13 34 45 N.; 81 21 10 W..	382	45.75	wh. crs. s....	Common.
10415	U.S.N.M.	4	D2171.....	37 59 30 N.; 73 48 40 W..	444	39.5	gn. m.....	Few.
10416	U.S.N.M.	1	D2204.....	39 30 30 N.; 71 44 30 W..	728	39.1	br. m.....	Rare.
10417	U.S.N.M.	10+	D2219.....	39 46 22 N.; 69 29 00 W..	948	38.8	gy. m.....	Common.
10431	U.S.N.M.	1	D2222.....	39 03 15 N.; 70 50 45 W..	1,537	36.9	gy. oz.....	Rare.
10418	U.S.N.M.	10+	D2377.....	29 07 30 N.; 88 08 00 W..	210	67	gy. m.....	Common.
10419	U.S.N.M.	6	D2381.....	28 05 00 N.; 87 56 15 W..	1,330	.....	lt. br. m.....	Few.
10420	U.S.N.M.	7	D2383.....	28 32 00 N.; 88 06 00 W..	1,181	39.8	br. gn. m....	Few.
10421	U.S.N.M.	10+	D2393.....	28 43 00 N.; 87 14 30 W..	525	41.1	lt. gy. m....	Common.
10422	U.S.N.M.	8	D2399.....	28 44 00 N.; 86 18 00 W..	196	51.6	gy. m.....	Few.
10423	U.S.N.M.	4	D2547.....	39 54 30 N.; 70 20 00 W..	390	39.6	gn. m.....	Few.
10424	U.S.N.M.	10	D2550.....	39 44 30 N.; 70 30 45 W..	1,081	38.5	br. m.....	Common.
10425	U.S.N.M.	5	D2552.....	39 47 07 N.; 70 35 00 W..	721	39.6	gy. oz.....	Few.
10426	U.S.N.M.	5	D2581.....	39 43 00 N.; 71 34 00 W..	394	.....	gn. m.....	Few.
10427	U.S.N.M.	2	D2586.....	39 02 40 N.; 72 40 00 W..	328	40.2	dk. gy. m....	Rare.
10428	U.S.N.M.	2	1188.....	12 29 00 N.; 62 38 30 W..	1,630	.....	m. bk. sp. for.	Rare.
10429	U.S.N.M.	2	*Fish Hawk* 869.	02 18 N.; 70 23 06 W..	192	50	fne. s.....	Rare.

CYCLAMMINA PUSILLA H. B. Brady.

Plate 11, figs. 4–6.

Cyclammina pusilla H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 53.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 32, pl. 6, figs. 242–244.—Chapman, Proc. Zool. Soc. London, 1895, p. 18.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 32.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 282, pl. 28, fig. 2.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 111, fig. 172.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1009.

Description.—Test small, compressed, planospiral, periphery sharply angled, slightly lobulated, consisting of about three coils, involute, but not completely so, the previous coil slightly exposed in the umbilical region; chambers numerous, about 15 in the last-formed coil, triangular in face view, sutures slightly sigmoid, distinct, slightly depressed; wall arenaceous, porous within and showing a tendency to become labyrinthic, surface smooth; aperture a curved slit at the base of the apertural face; color reddish brown.

Diameter, 0.5–1.5 mm.

Distribution.—Brady records this species from but two *Challenger* stations, one, 323, east of Buenos Aires, in 1,900 fathoms (3,475 meters), the other, 153, off the Antarctic Ice Barrier, in 1,675 fathoms (3,063 meters). It is later recorded from *Challenger* stations 24, off Culebra Island, West Indies, in 390 fathoms (713 meters), and 85, off the Canaries, in 1,125 fathoms (2,057 meters). Goës records it at numerous stations in the Caribbean Sea, but

there are no specimens in his collection as far as I have seen. However, from *Albatross* station, D2394, there are numerous small specimens in the Goës collection with a typical *C. cancellata*, which ought to be referred to *C. pusilla*, but all are mounted together and labeled *C. cancellata* by Goës. Pearcey records it from numerous *Scotia* stations in the South Atlantic and Antarctic.

In the *Albatross* material from the Atlantic I have not found the species, all those smaller specimens being referred to *C. compressa*, as they are as a rule too large for typical *C. pusilla* and more definitely like *C. compressa*.

There is a possibility of *C. pusilla* being the young of the species of which *C. compressa* is the adult, but large specimens are not mentioned from the southern regions where *C. pusilla* seems to be most characteristic, and in the Pacific material that I have seen they are not as a rule found together.

CYCLAMMINA ORBICULARIS H. B. Brady.

Plate 11, figs. 7–9.

Cyclammina orbicularis H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 53; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 353, pl. 37, figs. 17–19.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 113, figs. 173*a*, *b*.

Description.—Test subglobose, planospiral, as broad as high, composed of usually less than two complete coils, surface smooth, glossy, involute, chambers 11–12 in the last-formed coil, much broader than high, oblique in side view and triangular, sutures distinct and somewhat depressed; wall of sand grains with abundant cement; aperture a long, narrow, curved slit at the base of the apertural face of the chamber, simple; color various shades of gray and brown.

Diameter, 1.5–2 mm.

Distribution.—The only record for the Atlantic seems to be that of the *Challenger* station 323, in 1,900 fathoms (3,475 meters), east of Buenos Aires. I have not found it in the *Albatross* material. The other records are *Challenger* station 153, off the Antarctic Ice barrier, 1,675 fathoms (3,063 meters), and station 168, east coast of New Zealand, 1,100 fathoms (2,012 meters) (Brady), west coast of Mexico, *Albatross* D3419, in 772 fathoms (1,412 meters) (Goës, Cushman), and a questionable specimen off Japan.

CYCLAMMINA BRADYI Cushman.

Plate 11, fig. 3.

Trochammina trullissata H. B. Brady (part), Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 342, pl. 40, fig. 13 (not 14, 15).

Cyclammina bradyi Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 113, figs. 174*a*, *b*.

Description.—Test planospiral, nearly completely involute, slightly umbilicate, compressed, periphery bluntly angled, very slightly lobu-

lated, chambers six to nine in the last coil, high and narrow, generally triangular in front view, sutures distinct, slightly sigmoid, wall of fine sand grains with an excess of yellowish or reddish brown cement smooth and glossy; aperture crescentiform, at the base of the apertural face, between the base of the wall and the previous volution, in adult specimens occasionally with a few circular perforations on the apertural face of the last-formed chamber; color yellowish or reddish brown.

Diameter, 1–1.5 mm.

Distribution.—As this species is a segregation from *Haplophragmoides trullissata* it is impossible without an examination of specimens to say which of the older records belong to this or the other species. In the Pacific single specimens were found at two stations, and in the *Albatross* Atlantic material single specimens were found at three stations, one off the northeastern coast of the United States and the other two in the Caribbean. They are very typical, so the species evidently has a wide distribution in cold waters and usually at considerable depths.

Cyclammina bradyi—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
						°F.		
10132	U.S.N.M.	1	D2542...	40 00 15 N.; 70 42 20 W..	129	47.2	s. brk. sh....	Rare.
10133	U.S.N.M.	1	H80.....	13 56 35 N.; 63 02 00 W..	684	.....	gy. m. for....	Rare.
10134	U.S.N.M.	1	H86.....	12 58 40 N.; 62 48 00 W..	1,635	.....	bu. m. for. bk. sp.	Rare.

Genus LITUOTUBA Rhumbler, 1895.

Trochammina (part) H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 59; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 342.—Chapman, The Foraminifera, 1902, p. 151.

Lituotuba Rhumbler, Nachr. Köngl. Ges. Wiss. Göttingen, 1895, p. 83.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 113. (Type, *L. lituiformis* (H. B. Brady)=*Trochammina lituiformis* H. B. Brady.)

Description.—Test of two distinct parts, an early close-coiled portion and a long tubular uncoiled later portion; wall arenaceous, with an excess of cement, either indistinctly or irregularly divided.

This genus seems related, on the one hand, to *Ammodiscus* through such a form as *Trochamminoides proteus* (Karrer), but shows a definite senescent character in its uncoiled form. Besides certain fossil species this genus includes the following recent species:

LITUOTUBA LITUIFORMIS (H. B. Brady).

Plate 12, figs. 1 and 2.

Trochammina lituiformis H. B. Brady, Quart. Journ. Micr. Soc., vol. 19, 1879, p. 59, pl. 5, fig. 16; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 342, pl. 40, figs. 4–7.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 281, pl. 26, fig. 1.—Chapman, The Foraminifera, 1902, p. 151, pl. 8, fig. *E*.—Bagg, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 128.

Lituotuba lituiformis Rhumbler, Nachr. Köngl. Ges. Wiss. Göttingen, 1895, p. 84; Arch. Prot., vol. 3, 1903, p. 279, fig. 128*a*, *b*.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 114, fig. 175.

Description.—Test composed of a close-coiled early portion and a later uncoiled portion, straight and tubular but divided into chambers; chambers numerous, often somewhat indistinctly marked, of unequal length but of fairly uniform diameter; wall arenaceous with an excess of cement, surface smooth; aperture rounded, at the end of the tubular portion, in perfect specimens somewhat contracted from the normal diameter of the tubular chamber; color yellowish brown.

Length up to 5 mm.

Distribution.—This is rather a rare species recorded by Brady in the *Challenger* report from but three stations, all in the Atlantic; station 24, off Culebra Island, West Indies, in 390 fathoms (713 meters); station 76, off the Azores, in 900 fathoms (1,646 meters), and station 129, off Pernambuco, Brazil, in 675 fathoms (1,234 meters). Goës combines *Trochamminoides proteus* and this species, so his records are not available, except *Albatross* H215, from which there is material in the Goës collection. Flint's material was from two *Albatross* stations in the northern part of the Gulf of Mexico, D2394 and D2395 in 420 and 347 fathoms (768 and 635 meters), off the west coast of Cuba, D2352 in 463 fathoms (847 meters) and off Bahia, Brazil, D2760 in 1,019 fathoms (1,864 meters). The *Albatross* material I have had has been from the northern part of the Gulf of Mexico and from both the eastern and western Carribbean.

Lituotuba lituiformis—material examined.

Cat. No.	Coll. of -	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10464	U.S.N.M.	1	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Rare.
10465	U.S.N.M.	1	D2398...	28 45 00 N.; 86 26 00 W..	227	48.6	gy. m.....	Rare.
10466	U.S.N.M.	1	H49.....	17 37 30 N.; 65 15 00 W..	928	.....	oz. for.....	Rare.
10467	U.S.N.M.	1	H80.....	13 56 35 N.; 63 02 00 W..	684	.....	gy. m. for....	Rare.
10468	U.S.N.M.	2	H82.....	13 29 00 N.; 62 42 40 W..	1,051	.....	for. m. bk. sp.	Rare.
10469	U.S.N.M.	1	H86.....	12 58 40 N.; 62 48 00 W..	1,035	.....	bu. m. for. bk. sp.	Rare.
10470	U.S.N.M.	1	H88.....	12 29 00 N.; 62 38 30 W..	1,030	.....	m. bk.sp.for.	Rare.
		1	H89.....	12 07 39 N.; 62 24 00 W..	1,552	.....	bu. m. for..	Rare.
10471	U.S.N.M.	4	H215....	18 54 30 N.; 75 16 30 W..	1,486	.....	yl. m. brk. sh. for.	Few.
10472	U.S.N.M.	6	H405....	18 43 00 N.; 83 36 45 W..	735	.....	yl. oz. for. pter.	Few.

Genus AMMOBACULITES Cushman, 1910.

Spirolina (part) d'Orbigny, For. Foss. Bass. Tert. Vienne, 1846, p. 137.
Haplophragmium (part) H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 301.—Chapman, The Foraminifera, 1902, p. 138.
Ammobaculites Cushman, Bull. U. S. Nat. Mus., pt. 1, 1910, p. 114. (Type, *Ammobaculites agglutinans* (d'Orbigny).)

Description.—Test free, composed of several chambers, early portion close coiled in a single plane, later portion uncoiled and made up of a more or less linear series of chambers; wall coarsely arenaceous, usually rather thick; aperture single at the distal end of the last-formed chamber in the adult uncoiled specimen, but in the young usually at the base of the apertural face.

This genus is distinguished from the typical *Haplophragmium* of Reuss by lacking the multiple apertures and labyrinthic chambers of that genus. Both have the uncoiled later development. The true *Haplophragmium* is rather rare in the present oceans, but the species have the character of multiple apertures. The name *Haplophragmium* has been applied to coiled and uncoiled forms, trochoid and irregularly formed specimens, but these are here divided structurally into several genera.

AMMOBACULITES AGGLUTINANS (d'Orbigny).

Plate 12, fig. 3.

Spirolina agglutinans d'Orbigny, For. Foss. Bass. Tert. Vienne, 1846, p. 137, pl. 7, figs. 10–12.
Haplophragmium agglutinans H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 301, pl. 32, figs. 19, 20, 24–26.—Haeusler, Neues Jahrb., Beil., vol. 4, 1885, p. 13, pl. 1, figs. 22, 23; pl. 2, figs. 3, 4.—Balkwill and Wright, Trans. Roy. Irish Acad., vol. 28, 1885, p. 330, pl. 13, figs. 18–20.—Sherborn and Chapman, Journ. Roy. Micr. Soc., 1889, p. 484, pl. 11, fig. 8.—Haeusler, Abh. Schweiz. Pal. Ges., vol. 17, 1890, p. 32, pl. 3, figs. 32, 36; pl. 4, figs. 5, 6, 18.—Fornasini, For. Plioc. Pont. Savena, pl. 2, fig. 5.—Chapman, Journ. Roy. Micr. Soc., 1892, p. 324, pl. 5, fig. 14.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 260, pl. 4, figs. 16, 36.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 23, pl. 5, figs. 140, 141.—Chapman, Ann. Mag. Nat. Hist., vol. 16, 1895, p. 313, pl. 11, fig. 2 (?); Proc. Zool. Soc. London, 1895, p. 16.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 32.—Millett, Journ. Roy. Micr. Soc., 1899, p. 357, pl. 5, fig. 1.—Bagg, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 126.—Heron-Allen and Earland, Journ. Roy. Micr. Soc., 1909, p. 322; Trans. Zool. Soc. London, vol. 20, 1915, p. 612.
Ammobaculites agglutinans Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 115, fig. 176.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1010.—Cushman, Proc. U. S. Nat. Mus., vol. 56, 1919, p. 600.
Haplophragmium calcareum Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 275, pl. 19, fig. 1 (not *H. calcareum* d'Orbigny).

Description.—Test elongate, early portion closely coiled, planospiral, of one or usually more coils, each with five to seven chambers, later portion uncoiled, subcylindrical, made up of a linear series of

chambers, in adult specimens making up the larger portion of the test; wall rather coarsely arenaceous, somewhat variable in its surface, usually roughened, but occasionally fairly smooth; aperture in the early uncoiled portion slit-like, at the base of the apertural face, in the uncoiled portion the aperture is in the middle of the terminal face and is rounded; color variable, usually gray.

Diameter of coiled portion about 1 mm.; total length up to 3 mm.

Distribution.—This is a very widely distributed species, but has been used to include more than one species. Some of these are noted here, but older records as a rule need checking from the original specimens. In the *Albatross* material it is very common at numerous stations, in general between latitudes 37° and 40° N., and longitudes 66° and 74° W. Specimens were also obtained in the Gulf of Mexico which are referred to this species, but they are not as typical as a rule. It is best developed in fairly deep, cold water.

In the rougher specimens the sutures dividing the chambers are difficult to distinguish, but are more clearly shown in the smoother forms. As the amount of cement is not dominant, the color largely depends upon the material of which the test is composed.

Ammobaculites agglutinans—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10189	U.S.N.M.	6	D2003...	37 16 30 N.; 74 20 36 W..	641	.....	.....	Few.
10191	U.S.N.M.	2	D2018...	37 12 22 N.; 74 20 01 W..	788	39	bu. m.....	Rare.
10192	U.S.N.M.	9	D2035...	39 26 16 N.; 70 02 37 W..	1,302	.....	glob. oz....	Common.
10193	U.S.N.M.	7	D2036...	38 52 0 N.; 69 24 0 W..	1,735	38	glob. oz.....	Common.
10194	U.S.N.M.	7	D2037...	38 53 00 N.; 69 23 30 W..	1,731	38	glob. oz.....	Common.
10195	U.S.N.M.	10+	D2038...	38 30 30 N.; 69 08 25 W..	2,033	.....	glob. oz.....	Common.
10196	U.S.N.M.	10+	D2039...	38 19 26 N.; 68 20 20 W..	2,369	.....	glob. oz.....	Common.
10197	U.S.N.M.	10+	D2041...	39 22 50 N.; 68 25 00 W..	1,408	38	glob. oz.....	Common.
10198	U.S.N.M.	10+	D2042...	39 33 00 N.; 68 26 45 W..	1,355	38.5	glob. oz.....	Common.
10199	U.S.N.M.	1	D2043...	39 49 00 N.; 68 28 30 W..	1,767	38.5	glob. oz.....	Few.
10500	U.S.N.M.	9	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Common.
10501	U.S.N.M.	2	D2160...	23 10 31 N.; 82 20 37 W..	167	.....	co.....	Rare.
10502	U.S.N.M.	6	D2202...	39 38 00 N.; 71 39 45 W..	515	39.1	gn. m.....	Few.
10503	U.S.N.M.	3	D2201...	39 30 30 N.; 71 44 30 W..	728	39.1	br. m.....	Few.
10504	U.S.N.M.	9	D2221...	39 05 30 N.; 70 44 30 W..	1,525	36.9	gy. oz.....	Frequent.
10505	U.S.N.M.	8	D2222...	39 03 15 N.; 70 50 45 W..	1,337	36.9	gy. oz.....	Frequent.
10506	U.S.N.M.	2	D2226...	37 00 00 N.; 71 51 00 W..	2,015	36.8	glob. oz.....	Few.
10507	U.S.N.M.	4	D2262...	39 54 45 N.; 69 29 45 W..	250	41.6	gn. m. s.....	Few.
10508	U.S.N.M.	4	D2372...	29 15 30 N.; 85 29 30 W..	27	.....	g.....	Few.
10509	U.S.N.M.	1	D2377...	29 07 30 N.; 88 08 00 W..	210	67	gy. m.....	Rare.
10510	U.S.N.M.	1	D2383...	28 33 00 N.; 87 14 30 W..	525	41.1	lt. gy. m....	Rare.
10511	U.S.N.M.	4	D2562...	39 15 30 N.; 71 25 00 W..	1,231	37.3	gy. oz.....	Few.
10512	U.S.N.M.	8	D2568...	39 15 00 N.; 68 08 00 W..	1,781	36.9	gy. oz.....	Common.
10513	U.S.N.M.	10+	D2570...	39 54 00 N.; 67 05 30 W..	1,813	36.8	glob. oz.....	Common.
10514	U.S.N.M.	1	D2572...	40 29 00 N.; 66 01 00 W..	1,769	37.8	gy. oz.....	Few.
10515	U.S.N.M.	1	D2573...	40 31 18 N.; 66 09 00 W..	1,712	37.3	gy. m. s.....	Few.
10516	U.S.N.M.	4	D2581...	39 43 00 N.; 71 31 00 W..	394	.....	gn. m.....	Few.
10517	U.S.N.M.	1	D2581...	39 05 30 N.; 72 23 20 W..	541	39.5	gy. m.....	Rare.
10518	U.S.N.M.	1	D2677...	32 39 00 N.; 76 50 30 W..	478	39.3	gn. m.....	Rare.
10519	U.S.N.M.	1	D2716...	38 29 30 N.; 70 57 00 W..	1,031	.....	br. oz. for...	Rare.

AMMOBACULITES PSEUDOSPIRALE (Williamson).

Plate 12, fig. 4.

Proteonina pseudospiralis Williamson, Rec. Foram. Great Britain, 1858, p. 2, pl. 1, figs. 2, 3.

Lituola nautiloidea, "feeble form," Parker and Jones, Introd. Foram., 1862, Appendix, p. 309.

Haplophragmium pseudospirale Siddall, Cat. British Recent Foram., 1879, p. 4.—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 302, pl. 33, figs. 1–4.—Wright, Proc. Roy. Irish Acad., ser. 3, vol. 1, 1891, p. 467.—Egger, Abh. bay. Akad. Wiss. München, vol. 18, 1893, p. 260, pl. 5, figs. 41, 42.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 23, pl. 5, figs. 146, 147 (not 142–144, 148–151).—Millett, Journ. Roy. Micr. Soc., 1899, p. 358.—Sidebottom. Proc. Manchester Lit. and Philos. Soc., vol. 49, pt. 2, No. 5, 1905, p. 3.—Rhumbler, Foram. Plankton Exped., teil 1, 1911, pl. 2, fig. 15; teil 2, 1913, p. 379.—Heron-Allen and Earland, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 45; Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 223, pl. 40, fig. 14.

Description.—Test elongate, compressed, early portion spirally coiled, later portion uncoiled and straight but compressed throughout, chambers poorly marked, sutures indistinct; wall coarsely arenaceous with much cement, aperture irregular, usually a small opening at the end of the chamber.

Length, up to 1.5 mm.

Distribution.—Williamson's type specimens were from Skye. Brady gives the following localities "not uncommon amongst the islands on the west coast of Scotland at depths of 30-60 fathoms" (55–110 meters), two *Porcupine* dredgings from the coast of Ireland in 90 and 370 fathoms (165 and 677 meters) and from off Valentia, Ireland. Wright's specimens were from the southwest of Ireland 7-53 fathoms (13–97 meters) with a single very small specimen at 345 fathoms (631 meters). Heron-Allen and Earland record it as common in the Clare Island region off Ireland and off western Scotland.

It has not occurred in the *Albatross* material from the western Atlantic as far as I have seen and it is recorded neither by Goës nor by Flint from the same material.

In my own collection I have material from the second cruise of the S. S. *Protector* in 100 fathoms (183 meters), northwest of Belfast between Belfast and Port Patrick and from the *Lord Bandon* off S. W. Ireland in 38–44 fathoms (69–80 meters). The figures given by Goës and here referred to are very typical but as Goës included *A. foliaceum* also, the records are obscure.

The species is evidently common in comparatively shallow water off the coast of northern Europe but not from the western Atlantic as far as the material examined shows.

AMMOBACULITES CASSIS (Parker).

Plate 12, fig. 5.

Lituola cassis Parker, in Dawson, Canad. Nat., vol. 5, 1870, pp. 177, 180, fig. 3.
Haplophragmium cassis H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 304, pl. 33, figs. 17–19.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 261, pl. 5, figs. 55, 56.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 24, pl. 5, figs. 152–157.—Flint, Ann. Rep. U. S. Nat. Mus., 1897 (1899), p. 275, pl. 19, fig. 4.—Millett, Journ. Roy. Micr. Soc., 1899, p. 359, pl. 5, figs. 4–6, 7?.—Chapman, Journ. Linn. Soc., vol. 28, 1902, p. 408, pl. 36, fig. 8.—Awerinzew, Mem. Acad. Imp. Sci. St. Petersbourg, ser. 8, vol. 29, No. 3, 1911, p. 20.

Description.—Test planospiral, compressed, early portions coiled, later chambers uncoiled but obliquely placed, periphery rounded, chambers comparatively few, only four or five in the uncoiled portion, sutures distinct but slightly depressed; wall composed of coarse sand grains but smoothly finished, with a yellowish brown cement; aperture simple at the distal or peripheral end of the chamber in the uncoiled portion; color yellowish brown.

Length, up to 1.5 mm.

Distribution.—This is an Arctic species of shallow water, originally described from Gaspé Bay in the Gulf of St. Lawrence in 16 fathoms (29 meters). Brady gives two other localities, Lievely Harbor, Disco, Greenland, 5–20 fathoms (9–37 meters) and Deva Bay, Spitzbergen, latitude 77° 30′ N. in 7 fathoms (13 meters). Flint records it from Portland, Maine, 4–5 fathoms (7–9 meters). Awerinzew records it from the Siberian Arctic. It occurs in deep cold waters elsewhere, however. Millett's material does not seem at all typical and from the figures appears to be an entirely different species. Egger's material from the coast of equatorial Africa does not belong to the species as far as is shown by the figures.

The species has not occurred in the *Albatross* material I have examined but it is mostly in deeper water than the recorded stations for this species. In my own dredgings, however, I have found it from 10–18 fathoms (18–33 meters) in the outer part of Casco Bay, Maine, which is the same general area recorded by Flint as Portland, Maine. It was not met with in any of the shallow water dredgings in the Woods Hole region, showing that it is probably not found south of Cape Cod in shallow water. This lack of data in the *Albatross* material seems to show that it is really an Arctic species coming southward in very cold water along the western Atlantic coast in shallow water and perhaps elsewhere. I have had it also in the Arctic material of the Candian Arctic Expedition.

All the material I have seen shows little variation in general characters, the breadth of the test being the only character that shows an appreciable variation.

AMMOBACULITES AMERICANUS Cushman.

Plate 12, figs. 6 and 7.

Haplophragmium fontinense H. B. Brady (not *H. fontinense* Terquem), Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 305, pl. 34, figs. 1–4.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 261, pl. 5, fig. 47.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 31.—Chapman, Journ. Linn. Soc. Zoology, vol. 30, 1910, p. 491.

Ammobaculites americanus Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 117, figs. 184, 185.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1010.

Description.—Test planospiral in the early portion, compressed, only partially involute, composed of three or four coils with about nine chambers in the outer coil, the last-formed chambers in adult specimens tending to form uncoiled straight growth; chambers distinct, sutures slightly depressed; wall of fairly coarse sand grains firmly cemented; aperture elongate, oval, or forming a long slit across the apertural face of the chamber; color gray.

Length up to 2.5 mm.

Distribution.—As *H. fontinense* this species is recorded by Brady from the South Atlantic, *Challenger* station 323 east of Buenos Aires in 1,900 fathoms (3,475 meters).

It is also known from the west coast of South America (Brady), from the west coast of Mexico (Goës, Cushman), from deep water off Funafuti (Chapman), and from the Antarctic (Pearcey). Egger records the species from off Mauritius, but his figure would not warrant one in putting it in this species without examining the original material. It is evidently a species of the South Atlantic and Pacific.

AMMOBACULITES FOLIACEUS (H. B. Brady).

Plate 13, figs. 1 and 2.

Haplophragmium foliaceum H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 50; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 304, pl. 33, figs. 20–25.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 276, pl. 19, fig. 6.

Ammobaculites foliaceus Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 116, figs. 177–179.

Description.—Test much compressed, elongate, early portion close coiled, planospiral, consisting of two or three coils; later portion uncoiled, straight, uniserial; chambers distinct, sutures usually well marked, but not depressed; wall coarsely arenaceous but with a smooth surface; aperture in the uncoiled portion of the adult simple, terminal, elongate; color reddish or yellowish brown.

Length up to 1.25 mm.

Distribution.—The distribution of this species from the available records includes a wide area. The best *Challenger* material according to Brady was from station 323 in the South Atlantic east of Buenos Aires in 1,900 fathoms (3,475 meters), where it was "tolerably abun-

dant." The other records are south of Australia, 2,600 fathoms (4,755 meters); north of New Guinea, 1,070 fathoms (3,109 meters), and south of Japan, 345 fathoms (631 meters); "but the specimens from these [last three] localities are of poor dimensions and few in number." Flint records it from two *Albatross* stations D2377 in the Gulf of Mexico in 210 fathoms (384 meters) [?] and D2568 off Marthas Vineyard in 1,781 fathoms (3,257 meters). I have had the species from nine *Albatross* stations all but one of them south and west of the Georges Banks at depths ranging from 1,362 to 2,369 fathoms (2,491 to 3,332 meters). There is a later *Challenger* record from this same region, station 44 in 1,700 fathoms (3,109 meters). The other station is from the Gulf of Mexico in 27 fathoms. In examining the material in Dr. Flint's collection I find a slide with specimens from D2377 and D2568, the whole marked *Haplophragmium foliaceum*. There are numerous specimens of both *Ammobaculites foliaceus* and *A. tenuimargo* and as I have found *A. tenuimargo* at this station and not *A. foliaceus* I am inclined to think that Doctor Flint's record for *A. foliaceus* from D2377 should be changed to *A. tenuimargo*. Both species are however found in the Gulf of Mexico.

A. foliaceus is a very well defined species easily distinguished and it seems odd that it is not more often recorded if it has the wide distribution that Brady's other records seem to indicate. An examination of the original *Challenger* material should show whether these other records are this species or whether this is really an Atlantic species. It should be noted, however, that numerous species which have their origin in the Indo-Pacific are found along the western side of the Atlantic but not on the eastern side.

Ammobaculites foliaceus—material examined.

Cat. No.	Coll. of—	No. of spe i-mens.	Station.	Locality.	Depth in fath-oms.	Bot-tom tem-pera-ture.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10481	U.S.N.M.	2	D2035...	39 26 16 N.; 70 02 37 W..	1,362	.....	glob. oz.....	Rare.
10482	U.S.N.M.	3	D2036...	38 52 40 N.; 69 24 49 W..	1,735	38	glob. oz.....	Rare.
10483	U.S.N.M.	1	D2037...	38 53 00 N.; 69 23 30 W..	1,731	38	glob. oz.....	Rare.
10484	U.S.N.M.	3	D2038...	38 30 30 N.; 69 08 25 W..	2,033	.....	glob. oz.....	Few.
10485	U.S.N.M.	7	D2039...	38 19 26 N.; 68 20 20 W..	2,369	.....	glob. oz.....	Few.
10486	U.S.N.M.	5	D2097...	37 56 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Few.
10487	U.S.N.M.	2	D2226...	37 00 00 N.; 71 54 00 W..	2,015	36.8	glob. oz.....	Few.
10488	U.S.N.M.	6	D2372...	29 15 30 N.; 85 29 30 W..	27	.....	g.....	Few.
19189	U.S.N.M.	2	D2570...	39 54 00 N.; 67 05 30 W..	1,813	36.8	glob. oz.....	Few.

AMMOBACULITES TENUIMARGO (H. B. Brady).

Plate 13, figs. 3–5.

Haplophragmium tenuimargo H. B. Brady, Proc. Roy. Soc. Edinburgh, vol. 11, 1882, p. 715; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 303, pl. 33, figs. 13–16.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 275, pl. 19, fig. 3.

Ammobaculites tenuimargo CUSHMAN, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 117, figs. 180–183.—PEARCEY, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1010.

Description.—Test elongate, compressed, early portion close coiled, consisting of one to one and a half coils, later portion uncoiled, consisting in fully developed specimens of 11 to 13 chambers increasing gradually in size toward the apertural end, edges jagged, of coarse sand grains; chambers irregular in size and shape, made of a chitinous lining, to the outside of which are attached sand grains; wall thin on the inside, of chitin (?) and the exterior of angular quartz grains; aperture a small, rounded, simple opening at the end of the last-formed chamber; color white or gray.

Length, up to 2.5 mm.

Distribution.—This is a widely distributed species, the Atlantic *Challenger* records being Faroe Channel, 530 fathoms (969 meters); station 5, southwest of the Canaries, in 2,740 fathoms (5,011 meters); 323, east of Buenos Aires; 24, off Culebra Island, in 390 fathoms (713 meters), and 78, off western Africa, in 1,000 fathoms (1,829 meters).

Flint records the species from two *Albatross* stations, D2115, in 843 fathoms (1,542 meters), and D2584, in 541 fathoms (989 meters), off the northeastern coast of the United States. Pearcey records it from two *Scotia* stations in the South Atlantic or Antarctic in 1,775 and 2,620 fathoms (3,246 and 4,791 meters).

I have had specimens from eight *Albatross* stations, one in the Gulf of Mexico, the others off the eastern and northeastern coast of the United States. Depths range from 88 to 786 fathoms (161 to 1,437 meters), which is a much shallower range than for *A. foliaceus* from the same general region.

Outside the Atlantic the only records seem to be those of the *Challenger* report, stations 218, north of New Guinea, 1,070 fathoms; (3,109 meters); 168, east of New Zealand, 1,100 fathoms (2,012 meters), and 238, in the North Pacific, in 3,950 fathoms (7,224 meters).

An examination of specimens mounted in Canada balsam shows that there is a thin, brownish wall about each chamber and that they are very irregular, especially in the uncoiled part, the sand grains, most of which are of clear quartz, being simply incrusting instead of forming a constituent part of the wall, as in most other species. There is some indication that there are both microspheric and megalospheric forms in the material, the former with a coiled portion with small proloculum, while the other has a larger first chamber and the coil not so well developed.

Ammobaculites tenuimargo—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10473	U.S.N.M.	6	D2018...	37 12 22 N.; 74 20 04 W..	788	39	bu. m.....	Few.
10474	U.S.N.M.	2	D2189...	39 49 30 N.; 70 26 00 W..	600	39.7	gn. m. s....	Few.
10475	U.S.N.M.	2	D2200...	39 38 00 N.; 71 39 45 W..	515	39.1	gn. m.....	Few.
10476	U.S.N.M.	1	D2203...	39 34 15 N.; 71 41 15 W..	705	38.9	gn. m. s.....	Rare.
10477	U.S.N.M.	3	D2204...	39 30 30 N.; 71 44 30 W..	7.8	39.1	br. m.....	Rare.
10480	U.S.N.M.	1	D2312...	32 54 00 N.; 77 53 30 W..	88	57.8	crs. s. bk. sp.	Rare.
10478	U.S.N.M.	5	D2377...	29 07 30 N.; 88 08 00 W..	210	67	gy. m.....	Few.
10479	U.S.N.M.	3	D2581...	39 43 00 N.; 71 34 00 W..	394	.....	gn. m.....	Few.

AMMOBACULITES REOPHACIFORMIS Cushman.

Plate 13, fig. 6.

Haplophragmium agglutinans H. B. Brady (part, not d'Orbigny), Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, pl. 32, fig. 22 (not 19–21, 23–26).

Ammobaculites reophaciformis Cushman, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 440.

Description.—Test elongate, tapering, early portion consisting of a few chambers planospirally coiled and much compressed, making up but a small portion of the test, later and by far the larger part uncoiled, forming a straight linear series, circular in transverse section, and progressively increasing in size, the last-formed one being the largest, chambers fairly distinct, sutures slightly depressed; wall composed of angular fragments, smoothly finished; aperture circular, terminal, simple, occasionally with a slight neck; color usually white or gray.

Length, up to 3.5 mm.

Distribution.—Originally described from the Philippine region in depths of from 16–78 fathoms (29–143 meters) in coral-reef regions, this species is now known to be widely distributed. The lack of fine coral-reef material from the West Indies is the only reason for its not being more widely recorded here. I have it from one *Albatross* station, D2641, in 60 fathoms (110 meters), bottom temperature 69.2° F., (20.6° C.), off the coast of Florida. There is material also from the Tortugas in the Gulf of Mexico, and I have found it to be common in my own dredgings in 6–10 fathoms (11–18 meters) among the coral reefs at Montego Bay, Jamaica. It is undoubtedly widespread in the Bahamas, West Indies, and Florida among coral-reef conditions.

I have had material also from the coral reefs of the Hawaiian Islands.

Genus HAPLOPHRAGMIUM Reuss, 1860.

Spirolina Roemer (not Lamarck), Verst. norddeutsch. Kreide, 1840–41, p. 98.

Haplophragmium Reuss, Sitz. Akad. Wiss. Wien, vol. 40, 1860, p. 218. (Type, *Spirolina aequalis* Roemer.)

Description.—Test in the early portion close coiled, planospiral, later becoming uncoiled and straight; chambers distinct, not laby-

rinthic; wall arenaceous; aperture in the adult consisting of a number of pores, the apertural face often becoming sievelike.

This genus may be distinguished from *Ammobaculites* mainly in the characteristic aperture, which in its highest development becomes sievelike, with numerous pores, while that of *Ammobaculites* is simple. The tendency also in elongate specimens is for an increase in the size of the chambers as added, while in *Ammobaculites* the size is usually fairly constant when once attained, except in *A. reophaciformis*.

The genus as used by Reuss has been variously applied until at one time used for all the coiled, trochoid, or irregularly coiled tests with coarse, arenaceous walls. It is here used in its original sense as nearly as can be determined.

HAPLOPHRAGMIUM LITUOLINOIDEUM Goës.

Plate 13, fig. 7.

Haplophragmium lituolinoideum Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 32, pl. 3, figs. 17–20.

Description.—Test elongate, subcylindrical or conical, the early portion coiled, later portion uncoiled, uniserial, circular in transverse section; chambers distinct, those of the uncoiled portion gradually increasing in diameter, sutures distinct, slightly depressed; wall coarsely arenaceous; aperture in the early portion single, in the later portion becoming multiple and in large specimens composed of a considerable number of pores making a sievelike plate of the apertural face of the chamber; color gray or brown.

Length up to 3 mm.

Distribution.—Goës described this species from *Albatross* stations in the Gulf of Mexico at depths of 347–727 fathoms (635–1,330 meters). There is one lot of mounted material in the Goës collection and with that as a guide with the slightly conventionalized figure it is possible to make out the species clearly. In the examination of the *Albatross* Atlantic dredgings it has been found to be well distributed along the Atlantic coast of the United States and in the northern part of the Gulf of Mexico. Twenty stations are here given ranging in depth from 390 to 1,735 fathoms (713 to 3,173 meters).

It is evidently a *Haplophragmium* with its sievelike aperture and undivided chambers and can easily be distinguished from *Ammobaculites agglutinans* by the shape of the uncoiled portion which in *A. agglutinans* is cylindrical while that of *H. lituolinoideum* is decidedly conical. The aperture will of course at once prove the distinguishing character.

Haplophragmium lituolinoideum—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10678	U.S.N.M.	2	D2036...	38 52 40 N.; 69 24 40 W..	1,735	38	glob. oz.....	Few.
10679	U.S.N.M.	1	D2072...	41 53 00 N.; 65 35 00 W..	858	39	gy. m.....	Rare.
10680	U.S.N.M.	2	D2110...	35 12 10 N.; 74 57 15 W..	516	40	bu. m.....	Rare.
10681	U.S.N.M.	3	D2111...	35 03 50 N.; 74 57 40 W..	938	.....	gn. m.....	Rare.
10682	U.S.N.M.	6	D2115...	35 49 30 N.; 74 34 45 W..	843	39	m. fne. s....	Few.
10683	U.S.N.M.	1	D2171...	37 59 30 N.; 73 48 40 W..	444	39.5	gn. m.....	Rare.
10684	U.S.N.M.	3	D2203...	39 34 15 N.; 71 41 15 W..	705	38.9	gn. m. s.....	Rare.
10685	U.S.N.M.	1	D2204...	39 30 30 N.; 71 44 30 W..	728	39.1	br. m.....	Rare.
10686	U.S.N.M.	2	D2219...	39 46 22 N.; 69 29 00 W..	948	38 8	gy. m.....	Rare.
10687	U.S.N.M.	3	D2234...	39 09 00 N.; 72 03 15 W..	810	38.6	gn. m.....	Rare.
10688	U.S.N.M.	2	D2383...	28 32 00 N.; 88 06 00 W..	1,181	39.8	br. gn. m....	Rare.
10689	U.S.N.M.	4	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Few.
10690	U.S.N.M.	1	D2392...	28 47 30 N.; 87 27 00 W..	724	40.7	br. gy. m....	Rare.
10691	U.S.N.M.	1	D2394...	28 38 30 N.; 87 02 00 W..	420	41 8	gn. m.....	Rare.
3098	U.S.N.M.	1	D2530...	40 53 30 N.; 66 26 30 W..	956	38.4	gy. oz.....	Rare.
10592	U.S.N.M.	1	D2531...	40 42 00 N.; 66 33 00 W..	852	38.4	gy. m.....	Rare.
10693	U.S.N.M.	2	D2547...	39 54 30 N.; 70 20 00 W..	390	39.6	gn. m.....	Rare.
10694	U.S.N.M.	1	D2562...	39 15 30 N.; 71 25 00 W..	1,434	37.3	gy. oz.....	Rare.
10695	U.S.N.M.	4	D2581...	39 43 00 N.; 71 34 00 W..	394	.....	gn. m.....	Few.
10696	U.S.N.M.	2	D2706...	41 28 30 N.; 65 35 30 W..	1,188	.....	gy. oz. for....	Rare.
10697	U.S.N.M.	2	D2710...	40 06 00 N.; 68 01 30 W..	984	.....	gn. m.....	Rare.

Genus LITUOLA Lamarck, 1804.

Lituola Lamarck, Ann. Mus., vol. 5, 1804, p. 243 (Type, *L. nautiloidea* Lamarck).

Description.—Test crozier-shaped, the early portion planospiral, the later portion uncoiled and straight, test arenaceous, the chambers labyrinthic with radial vertical partitions and secondary septae; aperture typically of several pores.

The original material was Cretaceous but the following species seems to belong here unless an examination of the type species of the genus may show other characters.

It has the uncoiled test with the typical labyrinthic divisions, thus meeting the requirement of the characters of the genus.

LITUOLA MEXICANA, new species.

Plate 14, figs. 1–4.

Description.—Test of medium size, conical, the early portion close coiled, planospiral, consisting of one or more coils and making up a very small part of the entire test; remainder of the test uncoiled, straight, linear, the chambers gradually increasing in size, the last-formed one being the largest; chambers numerous, inflated, sutures distinctly depressed, interior labyrinthic, with radial partitions dividing the chamber and in addition various irregular secondary partitions; wall finely arenaceous with much cement; aperture uncertain, with a deep reëntrant circular mouth; color yellowish brown.

Length, 3.5 mm.

Distribution.—Type specimen (U.S.N.M. No. 10698) from *Albatross* station D2399 in the Gulf of Mexico in 196 fathoms (358 meters), bottom temperature 51.6° F. (10.9° C.) and not found elsewhere in the material examined.

This is a large and conspicuous species, at first sight like *Ammobaculites* but with very beautiful labyrinthic chambers and the aperture so far as may be seen in the specimens not multiple but a large circular opening deeply depressed at the sides.

Genus PLACOPSILINA d'Orbigny, 1850.

Placopsilina d'Orbigny, Prodr. Pal., vol. 2, 1850, p. 96. (Type, *Placopsilina cenomana* d'Orbigny).—H. B. Brady (part), Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 315.—Chapman, The Foraminifera, 1902, p. 139.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 118.

Description.—Test attached, composed of numerous chambers, the early portion close-coiled, later portions uncoiling and spreading out in an irregular but in general a linear series of chambers, building no floor; last portion of the test may be entirely free, made up of an irregular series of chambers; wall coarsely arenaceous, aperture rounded, at the end of the last-formed chamber.

The genus is characteristic of shallow waters of tropical or subtropical regions.

PLACOPSILINA CENOMANA d'Orbigny.

Plate 14, fig. 5.

Placopsilina cenomana d'Orbigny, Prodr. Pal., vol. 2, 1850, p. 185, No. 758.—Reuss, Denkschr. Akad. Wiss. Wien, vol. 7, 1854, p. 71, pl. 28, figs. 4, 5.—Bütschli, in Bronn, Klassen und Ordnungen des Thierreichs, vol. 1, 1880, p. 191, pl. 5, fig. 19.—Haeusler, Quart. Journ. Geol. Soc., vol. 39, 1883, p. 27, pl. 3, fig. 1; Neues Jahrb., vol. 1, 1883, p. 59, pl. 3, figs. 12–14.—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 315, pl. 36, fig. 1.—Wright, Proc. Belfast Nat. Field Club, 1884–85, App. 9, 1886, p. 320, pl. 26, figs. 3*a*, *b*.—Haeusler, Neues Jahrb., Beil., vol. 4, 1885, p. 8, pl. 1, figs. 24–25.—Howchin, Journ. Roy. Micr. Soc., 1888, p. 536, pl. 8, fig. 4.—H. B. Brady, Parker, and Jones, Trans. Zool. Soc.,vol. 12, 1888, p. 218, pl. 42, fig. 13.—J. Wright, Proc. Roy. Irish Acad., ser. 3, vol. 1, 1891, p. 468.—Chapman, Journ. Roy. Micr. Soc., 1892, p. 324, pl. 6, fig. *A*; Proc. Zool. Soc. London, 1895, p. 17; The Foraminifera, 1902, p. 139, pl. 7, fig. *E*.—Sidebottom, Mem. and Proc. Manchester Lit. and Philos. Soc., vol. 49, No. 5, 1905, p. 4, pl. 1, fig. 7.—Earland, Journ. Quekett Micr. Club, ser. 2, vol. 9, 1905, p. 200.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 119, fig. 186.—Heron-Allen and Earland, Trans. Zool. Soc. London, vol. 20, 1915, p. 615.

Lituola cenomana Jones and Parker, Quart. Journ. Geol. Soc., vol. 16, 1860, p. 302.—H. B. Brady, Proc. Somerset Arch. and Nat. Hist. Soc., vol. 13, 1867, p. 105, pl. 1, fig. 1.

Litnola (*Placopsilina*) *cenomana* W. B. Carpenter, Parker, and Jones, Intr. Foram., 1862, p. 143, pl. 11, figs. 11–14.

Description.—Test attached, early portion close coiled, of one or more whorls, later portion uncoiled, straight or irregular, of nearly uniform diameter, chambers of about the same length; chambers distinct, sutures distinct and slightly depressed; wall coarsely arenaceous; aperture simple, terminal; color gray.

Length, up to 5 mm.

Distribution.—This species seems to be fairly common in comparatively shallow water of tropical and subtropical seas but is known as far north as the British Isles. It has not been met with in the *Albatross* material except once, probably partly because the material is not favorable for attached forms. It occurred at D2371 in the Gulf of Mexico in 26 fathoms (48 meters).

Placopsilina cenomana—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		° F.		
10551	U.S.N.M.	1	D2371...	29 17 00 N.; 85 30 45 W..	26	.....	gy. s. brk. sh.	Rare.

PLACOPSILINA CONFUSA, new species.

Plate 14, fig. 6.

Placopsilina cenomana H. B. Brady (part, not *P. cenomana* d' Orbigny), Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, pl. 36, fig. 3.

Description.—Test small, early portion close coiled, later portion formed of a considerable number of irregularly hemispherical chambers in a more or less confused mass or in an irregularly winding series, chambers distinct, wall arenaceous with much yellowish or reddish brown cement; aperture small, at the end of the chamber; color yellowish or reddish brown.

Length, up to 0.60 mm.

Distribution.—Type specimens (U.S.N.M. No. 10549) from *Albatross* station D2115 in 843 fathoms (1,542 meters) east of Cape Hatteras. Other specimens occurred at stations in the same general region.

The species is attached to *Rhabdammina* and other arenaceous species and is therefore easily overlooked being small and of the same color as the material to which it is attached. The small size and peculiar arrangement of the chambers also make it inconspicuous. It is not unlike Brady's figure 3 of plate 36 of the *Challenger* Report in its more regular form. The measurement of those specimens is about 0.40–0.60 mm. while the typical *P. cenomana* of figure 1 is nearly ten times this size and lacks the color of *P. confusa*.

Placopsilina confusa—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		° F.		
10548	U.S.N.M.	1	D2111...	35 09 50 N.; 74 57 40 W..	938	.....	gn. m.....	Few.
10549	U.S.N.M.	1	D2115...	35 49 30 N.; 74 34 45 W..	843	39	m., fne. s....	Few.
10550	U.S.N.M.	1	D2171...	37 59 30 N.; 73 48 40 W..	444	39.5	gn. m.....	Few.

Genus TROCHAMMINA Parker and Jones, 1860.

Nautilus (part) Montagu, Test. Brit., Suppl., 1808, p. 81.
Rotalina (part) Williamson, Rec. Foram. Great Britain, 1858, p. 50.
Globigerina (part) Williamson, Rec. Foram. Great Britain, 1858, p. 56.
Trochammina (part) Parker and Jones, Quart. Journ. Geol. Soc., vol. 16, 1860, p. 304.—W. B. Carpenter, Parker, and Jones, Intr. Foram., 1862, p. 141.—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 337.—Eimer and Fickert, Zeitschr. Wiss. Zool., vol. 65, 1899, p. 695.—Chapman, The Foraminifera, 1902, p. 151.—Cushman, Bull. 71, U. S. Nat. Mus., pt., 1910, p. 120.—(Type, *T. inflata* (Montagu).=*Nautilus inflatus* Montagu.)
Lituola (part) Parker and Jones, Philos. Trans., vol. 155, 1865, p. 407.
Haplophragmium (part) Siddall, Cat. British Rec. Foram., 1879, p. 4.—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 312.—Chapman, The Foraminifera, 1902, p. 138.
Ammoglobigerina Eimer and Fickert, Zeitschr. Wiss. Zool., vol. 65, 1899, p. 704.

Description.—Test free or sometimes adherent, spiral, trochoid, chambered; all chambers visible when viewed from above, only the chambers of the last-formed volution visible from below; wall arenaceous usually with considerable cement; aperture an arched slit on the ventral side of the chamber at its contact with the preceding volution.

As here considered, *Trochammina* is restricted to those species like *T. inflata* or *T. squamata*, which have a true spiral, trochoid test with all the chambers visible only from above.

TROCHAMMINA SQUAMATA Jones and Parker.

Trochammina squamata Jones and Parker, Quart. Journ. Geol. Soc., vol. 16, 1860, p. 304.—W. B. Carpenter, Parker, and Jones, Intr. Foram., 1862, p. 141, pl. 11, fig. 1.—Parker and Jones, Philos. Trans., 1865, p. 407, pl. 15, figs. 30, 31*a–c*.—H. B. Brady, Ann. Mag. Nat. Hist., ser. 4, vol. 6, 1870, p. 288, pl. 11, fig. 4; Quart. Journ. Micr. Soc., vol. 19, 1879, p. 56.—Haeusler, Neues Jahrb., 1883, pt. 1, p. 60, pl. 4, fig. 8.—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 337, pl. 41, figs. 3*a–c*.—Haeusler, [?] Neues Jahrb., Beil., vol. 4, 1885, p. 29, pl. 3, fig. 30.—Balkwill and Wright, Trans. Roy. Irish Acad., p. 65, pl. 10, figs. 27–29, 40.—Haeusler, Abh. Schweiz. Pal. Ges., vol. 17, 1890, vol. 28, 1885, p. 331.—J. Wright, Proc. Roy. Irish Acad., ser. 3, vol. 1, 1891, p. 469.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 264, pl. 5, figs. 4–6.—Eimer and Fickert, Zeitschr. Wiss. Zool., vol. 65, 1899, p. 695, fig. 43 (in text).—Millett, Journ. Roy. Micr. Soc., 1899, p. 362.—Sidebottom, Mem. and Proc. Manchester Lit. and Philos. Soc., vol. 49, No. 5, 1905, p. 5.—Earland, Journ. Queckett Micr. Club, ser. 2, vol. 9, 1905, p. 202.—Heron-Allen and Earland, Journ. Roy. Micr. Soc., 1909, p. 325.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 120, fig. 187*a–b*.—Heron-Allen and Earland, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 50, pl. 3, figs. 7–10; Trans. Zool. Soc. London, vol. 20, 1915, p. 619; Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 228.—Cushman, Proc. U. S. Nat. Mus., vol. 56, 1919, p. 600 (?).
Trochammina proteus Karrer (part), Sitz. Akad. Wiss. Wien., vol. 52, 1865, p. 494, pl. 1, fig. 6 (not 1–5, 7, 8).

Description.—Test trochoid, low spired, composed of three or four volutions with five or more chambers in each whorl; chambers all

visible from above, lunate, sutures oblique, from below generally triangular, sutures slightly curved, umbilicate; wall arenaceous, rather smoothly cemented; aperture elongate, slightly arched, at the base of the chamber; color yellowish brown.

Diameter up to 1.25 mm.

Distribution.—Most of the records indicate that this species is found most frequently in comparatively shallow water. The few *Albatross* records however are in comparatively deep water, but the specimens seem to belong to this species. The other records are well scattered, those from about the British Isles in shallow water. There seem to be no records from the South Atlantic.

Heron-Allen and Earland discuss this species in their Clare Island paper, noting that in the *Challenger* report Brady was not correct in his figures and that a later confusion has resulted.

Trochammina squamata—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10702	U.S.N.M.	1	D2039...	38 19 26 N.; 68 20 20 W..	2,369	.....	glob. oz.....	Rare.
10703	U.S.N.M.	1	D2222...	39 03 15 N.; 70 50 45 W..	1,537	36.9	gy. oz.....	Rare.
10704	U.S.N.M.	1	D2562...	39 15 30 N.; 71 25 00 W..	1,434	37.3	gy. oz.....	Rare.
10705	U.S.N.M.	1	D2677...	32 39 00 N.; 76 50 30 W..	478	39.3	gn. m.....	Rare.

TROCHAMMINA INFLATA (Montagu).

Nautilus inflatus Montagu, Test. Brit., Suppl., 1808, p. 81, pl. 18, fig. 3.

Rotalina inflata Williamson, Rec. Foram. Great Britain, 1858, p. 50, pl. 4, figs. 93, 94.—Parker and Jones, Ann. Mag. Nat. Hist., ser. 3, vol. 4, 1859, p. 347, fig. F.—Williamson, Pop. Sci. Rev., vol. 4, 1865, p. 174, pl. 8, fig. 8.

Trochammina inflata W. B. Carpenter, Parker, and Jones, Int. Foram., 1862, p. 141, pl. 11, fig. 5.—H. B. Brady, Nat. Hist. Trans. Northumberland and Durham, vol. 1, 1865, p. 95.—Haeusler, Ann. Mag. Nat. Hist., ser. 5, vol. 10, 1882, p. 351, pl. 15, figs. 5–7; Neues Jahrb., 1883, pl. 1, fig. 60; pl. 4, figs. 6, 7.—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 338, pl. 41, figs. 4*a–c*.—Haeusler, Abh. Schweiz. Pal. Ges., vol. 17, 1890, p. 65, pl. 10, figs. 25, 26.—J. Wright, Proc. Roy. Irish Acad., ser. 3, vol. 1, 1891, p. 469.—Woodward and Thomas, Geol. and Nat. Surv. Minnesota, vol. 3, 1893, p. 28, pl. D, fig. 31.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, pl. 5, figs. 10–12, 16–18.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 29, pl. 6, figs. 222–224.—Millett, Journ. Roy. Micr. Soc., 1899, p. 364.—Fornasini, Mem. Real. Accad. Sci. Ist. Bologna, vol. 8, 1900, p. 367, fig. 15.—Sidebottom, Mem. and Proc. Manchester Lit. and Philos. Soc., vol. 49, No. 5, 1905, p. 6, pl. 1, fig. 9.—Earland, Journ. Quekett Micr. Club, ser. 2, vol. 9, 1905, p. 203.—Heron-Allen and Earland, Journ. Roy. Micr. Soc., 1909, p. 324.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 121, fig. 188*a*, *b*.—Heron-Allen and Earland, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 52; Trans. Zool. Soc. London, vol. 20, 1915, p. 620; Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 227.

Description.—Test trochoid, low spired, composed of about three volutions, the last-formed one consisting of five or six chambers, umbilicate, all chambers visible from above, only those of the last-formed coil from below; chambers inflated, subglobose, sutures distinct and deep, nearly at right angles to the periphery; wall of fine sand with an excess of cement, smooth and dully shining; aperture small, a small arched slit where the chamber meets the previous volution on the ventral side and slightly in from the periphery, color clear yellowish brown, the spire often darker than the outer whorl.

Diameter up to 1 mm.

Distribution.—Nearly all the records for this species are in comparatively shallow water. Brady records it from one *Challenger* station off Buenos Aires in 1,900 fathoms (3,475 meters), also as occurring at intervals all about the British Isles, on the northeast shore of the Bay of Biscay and the coast of Spain. It is recorded about the British Isles by various writers, especially by Balkwill and Wright and by Heron-Allen and Earland. The only *Albatross* stations from which I have seen it are one each from the Gulf of Mexico and the eastern coast of the United States in comparatively deep water.

Much more typical material however occurs in shallow water or shore sands of southern New England. I have specimens from shore sands from the following: Coffins Beach, Annisquam; Revere Beach; Nahant Beach; and from the bathing beach at Buzzards Bay, all in Massachusetts. These are clear honey yellow for the most part with the center somewhat darker. It is probably common in shallow water all along our coast.

Trochammina inflata—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10700	U.S.N.M.	1	D2037...	38 53 00 N.; 69 23 30 W..	1,731	38	glob. oz.....	Rare.
10701	U.S.N.M.	2	D2383...	28 32 00 N.; 88 06 00 W..	1,181	39.8	br. gn. m....	Rare.

TROCHAMMINA INFLATA (Montagu), var. MACRESCENS H. B. Brady.

Plate 15, fig. 1.

Trochammina inflata (Montagu), var. *macrescens* H. B. Brady, in G. S. Brady, Robertson, and H. B. Brady, Ann. Mag. Nat. Hist., ser. 4, vol. 6, 1870, p. 290, pl. 11, fig. 5.—H. B. Brady, Journ. Roy. Micr. Soc., 1887, p. 892.—Earland, Journ. Queckett Micr. Club, ser. 2, vol. 9, 1905, p. 203.—Heron-Allen and Earland, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 52; Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 227.

Variety differing from the typical in the more compressed form, and thinner test, probably as suggested by Heron-Allen and Earland a form due to low salinity of the water in which it lives.

Distribution.—Known from the region of the British Isles and not recorded elsewhere.

TROCHAMMINA NITIDA H. B. Brady

Plate 15, fig. 2.

Trochammina nitida H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 52; Denkschr. Akad. Wiss. Wien, vol. 43, 1881, p. 100; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 339, pl. 41, figs. 5, 6.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 30, pl. 6, figs. 225–230.—Millett, Journ. Roy. Micr. Soc., 1899, p. 363.—Awerinzew, Mem. Acad. Imp. Sci. St. Petersbourg, ser. 8, vol. 29, No. 3, 1911, p. 21.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1011.—Heron-Allen and Earland, Trans. Zool. Soc. London, vol. 20, 1915, p. 620; Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 228, pl. 40, figs. 19–21.

Description.—Test small, trochoid, depressed, composed of about three volutions, flattened above, convex below, somewhat umbilicate, periphery evenly rounded; chambers numerous, about nine in the last formed whorl, all visible from above only those of the last whorl from below, sutures straight or slightly curved, nearly at right angles to the periphery, slightly depressed; wall arenaceous, smoothly finished, aperture a curved slit near the base of the chamber; color gray brown, the last-formed chamber often light gray.

Diameter, up to 0.5 mm.

Distribution.—This is essentially an Arctic species, recorded from off Franz Josef Land and Nova Zembla, from northern Norway (Brady) a single station and single specimen off western Scotland (Heron-Allen and Earland) and off Prince Edward Island 50-100 fathoms (91–183 meters) and off the Cape Verde Islands, 1,070 fathoms (3,109 meters) (*Challenger*, Brady). Brady gives it from the estuary of the Dee and southwest of Ireland as rare, 40–100 fathoms (73–183 meters). Pearcey records it from two stations off the Falklands in 2¼ and 56 fathoms (4 and 102 meters). I have failed to find the species in the *Albatross* material.

TROCHAMMINA OCHRACEA (Williamson).

Plate 15, fig. 3.

Rotalina ochracea Williamson, Rec. Foram. Great Britain, 1858, p. 55, pl. 4, fig. 112; pl. 5, fig. 113.

Trochammina ochracea Balkwill and Millett, Journ. Micr., vol. 3, 1884, p. 24, pl. 1, fig. 7.—Millett, Journ. Roy. Micr. Soc., 1899, p. 363, pl. 5, fig. 12.—Sidebottom, Mem. Proc. Manchester Lit. and Philos. Soc., vol. 49, pt. 2, No. 5, 1905, p. 5, pl. 1, fig. 8.—Heron-Allen and Earland, Proc. Roy. Irish, Acad., vol. 31, pt. 64, 1913, p. 51; Trans. Zool. Soc., London, vol. 20, 1915, p. 618, pl. 46, figs. 27, 28; Trans. Linn. Soc., London, vol. 11, pt. 13, 1916, p. 227.

Description.—Test small, thin, much compressed, trochoid, consisting of about two volutions; chambers about eight in the last-formed coil, sutures not depressed, evenly curved, those of the ventral side, slightly angled; wall finely arenaceous, almost translucent; aperture a narrow slit near the inner margin of the chamber; color yellowish brown.

Diameter, 0.25 mm.

Distribution.—Williamson's type material was from the Shetlands. It is known from other localities from about the British Isles, especially off Ireland and Scotland. I have seen no specimens of this species in the *Albatross* or other material that I have examined.

TROCHAMMINA PLICATA (Terquem).

Plate 15, fig. 4.

Patellina plicata TERQUEM, Ess. Anim. Plage Dunkerque, pt. 2, 1876, p. 72, pl. 8, figs. 9, *a*, *b*.

Trochammina plicata BALKWILL and WRIGHT, Journ. Micr., vol. 3, 1884, p. 26, pl. 1, fig. 8.—HALKYARD, Trans. Ann. Rept. Manchester Micr. Soc., 1889, p. 69, pl. 1, fig. 11.—J. WRIGHT, Proc. Roy. Irish Acad., ser. 3, vol. 1, 1891, p. 469.—MILLETT, Journ. Roy. Micr. Soc., 1899, p. 363, pl. 5, fig. 13.—HERON-ALLEN and EARLAND, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 51; Trans. Zool. Soc. London, vol. 20, 1915, p. 619; Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 227.

This species has not occurred so far as I have seen in the *Albatross* or other American material. It is known from the vicinity of the British Isles off both Ireland and Scotland.

TROCHAMMINA BRADYI Robertson.

Plate 15, fig. 5.

Trochammina robertsoni H. B. BRADY, Journ. Roy. Micr. Soc., 1887, p. 893.—J. WRIGHT, Proc. Roy. Irish Acad., ser. 3, vol. 1, 1891, p. 469, pl. 20, figs. 4*a*, *b*.—GOËS, Köngl. Svensk. Vet. Akad., vol. 25, No. 9, 1894, p. 30, pl. 6, figs. 231–234.—EARLAND, Journ. Quekett Micr. Club, ser. 2, vol. 9, 1905, p. 203.—HERON-ALLEN and EARLAND, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 53; Trans. Linn. Soc., London, vol. 11, pt. 13, 1916, p. 228.

Trochammina bradyi ROBERTSON, Ann. Mag. Nat. Hist., ser. 6, vol. 7, 1891, p. 388.

Description.—Test small, coiled, very low spired or planospiral, outer whorl consisting of about six chambers, those of the previous whorl slightly exposed in the umbilical region; chambers inflated, subspherical, sutures distinct and depressed; wall finely arenaceous, with much cement, smooth; aperture a narrow crescentiform slit at the base of the apertural face of the chamber; color yellowish brown.

Diameter, about 0.25 mm.

Distribution.—This species seems to be common in the waters of the British Isles, but has not so far been recorded from the western Atlantic.

The change of name from *T. robertsoni* to *T. bradyi* as proposed by Robertson is made necessary by definite rules of nomenclature. In this case the change simply means a reversal of the two names and should be made for conformity.

Although I have not seen specimens, the figures suggest that this may be *Haplophragmoides* rather than *Trochammina*.

TROCHAMMINA ROTALIFORMIS J. Wright.

Plate 16, figs. 1 and 2.

Trochammina inflata (Montagu), var., Balkwill and Wright, Trans. Roy. Irish Acad., vol. 28 (Science), 1885, p. 331, pl. 13, figs. 11, 12.

Trochammina rotaliformis J. Wright, in Heron-Allen and Earland, Journ. Roy. Micr. Soc., 1911, p. 309.—Heron-Allen and Earland, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 52, pl. 3, figs. 11–13; Trans. Zool. Soc. London, vol. 20, 1915, p. 620.

Description.—Test small, trochoid, spire somewhat elevated, composed of about three volutions, gradually increasing in diameter; chambers distinct, four in each volution, sutures oblique and curved, slightly depressed, ventral side irregular, the last-formed chamber occupying nearly one-half the area of the test, smoothly finished; aperture elongate, at the base of the chamber in the umbilical region, with a sort of lip-like projection above; color reddish or yellowish brown.

Diameter, up to 0.45 mm.

Distribution.—This species is known from various localities about the British Isles, especially off Ireland, but has not been recorded from the western Atlantic.

TROCHAMMINA GLOBULOSA, new species.

Plate 16, figs. 3 and 4.

Description.—Test subglobose, trochoid, spire depressed, consisting of about three volutions, chambers rapidly increasing in size, four or five in the last-formed volution, chambers subglobose, sutures deep; wall finely arenaceous, with much cement, smoothly finished; aperture large, umbilicate, formed by the umbilicate region of the last volution and the arch of the last-formed chamber; color dark reddish brown, the last-formed chamber lighter in color.

Diameter, up to 1.25 mm.

Distribution.—Type specimen (U.S.N.M. No. 10625) from *Albatross* station D2383 in the Gulf of Mexico. There are several other stations for this species in the Gulf of Mexico and in the Caribbean and several off the northeastern coast of the United States.

The species is in some respects like *T. globigeriniformis*, but differs in the texture of the wall, the dark red color with dull, shining surface, and especially the form of the chambers and the very large

umbilicate aperture. Its contour and aperture are very suggestive of certain of the trochoid species of *Globigerina*. Altogether it is a very distinct species in the western Atlantic material.

Trochammina globulosa—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10621	U.S.N.M.	1	D2037...	38 53 00 N.; 69 23 30 W..	1,731	38	glob. oz.....	Rare.
10622	U.S.N.M.	2	D2038...	38 30 30 N.; 69 08 25 W..	2,033	.....	glob. oz.....	Few.
10623	U.S.N.M.	5	D2041...	39 22 50 N.; 68 25 00 W..	1,608	38	glob. oz.....	Few.
10624	U.S.N.M.	10+	D2226...	37 00 00 N.; 71 54 00 W..	2,045	36.8	glob. oz.....	Common.
10625	U.S.N.M.	6	D2383...	28 32 00 N.; 88 06 00 W..	1,181	39.8	br. gn. m....	Few.
10626	U.S.N.M.	3	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Few.
10627	U.S.N.M.	1	D2392...	28 47 30 N.; 87 27 00 W..	724	40.7	br. gy. m....	Rare.
10628	U.S.N.M.	2	D2393...	28 43 00 N.; 87 14 30 W..	525	41.1	lt. gy. m....	Rare.
10629	U.S.N.M.	2	D2394...	28 38 30 N.; 87 02 00 W..	420	41.8	gn. m.....	Rare.
10630	U.S.N.M.	2	D2562...	39 15 30 N.; 71 25 00 W..	1,434	37.3	gy. oz.....	Rare.
10631	U.S.N.M.	1	D2581...	39 43 00 N.; 71 31 00 W..	394	.....	gn. m.....	Rare.
10632	U.S.N.M.	2	D2682...	39 38 00 N.; 70 22 00 W..	1,004	.....	gn. m. s.....	Rare.
10633	U.S.N.M.	1	HS8.....	12 29 00 N.; 62 38 30 W..	1,630	.....	m.bk.sp.f.r.	Rare.

TROCHAMMINA GLOBIGERINIFORMIS (Parker and Jones).

Plate 16, figs. 5 and 6.

Globigerina bulloides Williamson, Rec. Foram. Great Britain, 1858, p. 56, pl. 5, figs. 116–118 (not *G. bulloides* d'Orbigny, 1828).

Lituola nautiloidea, var. *globigeriniformis* Parker and Jones, Philos. Trans., vol. 155, 1865, p. 407, pl. 15, figs. 46, 47.

Lituola (Haplophragmium) globigeriniformis Terrigi, Att. Accad. Pont., 1880, p. 175, pl. 1, fig. 3.

Haplophragmium globigeriniforme Siddall, Cat. British Rec. Foram., 1879, p. 4.—W. B. Carpenter, The Microscope, ed. 6, 1881, p. 561, fig. 320*a*, *b*.—H. B. Brady, Denkschr. Akad. Wiss. Wien, vol. 43, 1881, p. 100; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 312, pl. 35, figs. 10–11.—Balkwill and Wright, Trans. Roy. Irish Acad., vol. 28, 1885, p. 329.—Haeusler, Abh. Schweiz. Pal. Ges., vol. 17, 1890, p. 36, pl. 4, figs. 13, 16, 17.—J. Wright, Proc. Roy. Irish Acad., ser. 3, vol. 1, 1891, p. 468.—Terrigi, Mem. Roy. Com. Geol. Italia, vol. 4, 1891, p. 68, pl. 1, fig. 7.—Chapman, Journ. Roy. Micr. Soc., 1892, p. 324, pl. 5, fig. 16.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 260, pl. 5, figs. 30, 31.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 22, pl. 5, figs. 128–133.—Chapman, Proc. Zool. Soc. London, 1895, p. 16.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 30.—Flint, Rep. U. S. Nat. Mus., 1897 (1899), p. 277, pl. 21, fig. 1.—Millett, Journ. Roy. Micr. Soc., 1899, p. 361.—Sidebottom, Mem. and Proc. Manchester Lit. and Philos. Soc., vol. 49, No. 5, 1905, p. 4, pl. 1, fig. 6.—Bagg, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 126.—Heron-Allen and Earland, Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 46; Trans. Zool. Soc. London, vol. 20, 1915, p. 614; Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 224.

Trochammina globigeriniformis Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, pl. 24, figs. 193–195.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1011.

Ammoglobigerina bulloides Eimer and Fickert, Zeitschr. Wiss. Zool., vol. 65, 1899, p. 704.

Description.—Test free or adherent, spiral, trochoid, spire varying in its elevation, usually wider than high, chambers globose, all visible from above, only those of the last coil from below, sutures deeply depressed; test composed of from two to four volutions, the last-formed one usually of 3–5 chambers, rapidly increasing in size as added; wall of sand grains, the surface usually smooth; aperture an arched slit on the ventral side of the chamber at its contact with the adjacent chamber of the previous volution; color reddish brown, occasionally gray.

Diameter, 0.5–2 mm.

Distribution.—This is a very common and widely distributed species in deep, cold waters. The records cover well the Atlantic area where dredgings have been made. From the *Albatross* material it is most common in the cold area off the northeastern coast of the United States, but is found along the coast southward, in the Gulf of Mexico, the Caribbean, and off the coast of South America.

There is some variation in the height of the spire and in the relative amount of cement used in the construction of the test and therefore in its color.

The species belongs to the genus *Trochammina* as here considered, the difference in the height of the test being due to the globular character of the chambers. It is occasionally found attached and the test surrounded, as is usual with other fixed species of the genus, with an area of gray, finely granular particles. Such a fixed specimen is shown by Brady (pl. 35, fig. 11).

Trochammina globigeriniformis—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10566	U.S.N.M.	3	D2003...	37 16 30 N.; 74 20 38 W..	641	.....	.....	Few.
10567	U.S.N.M.	1	D2018...	37 12 22 N.; 74 20 04 W..	788	39	bu. m.....	Rare.
10568	U.S.N.M.	1	D2034...	39 27 10 N.; 69 56 20 W..	1,346	38	glob. oz.....	Rare.
10569	U.S.N.M.	8	D2037...	38 53 00 N.; 69 23 30 W..	1,731	38	glob. oz.....	Frequent.
10570	U.S.N.M.	10+	D2038...	38 30 30 N.; 69 08 25 W..	2,033	.....	glob. oz.....	Frequent.
10571	U.S.N.M.	5	D2039...	38 19 23 N.; 68 20 20 W..	2,3 9	.....	glob. oz.....	Common.
10572	U.S.N.M.	7	D2041...	39 22 50 N.; 68 25 00 W..	1,108	38	glob. oz.....	Common.
10573	U.S.N.M.	5	D2042...	39 33 00 N.; 68 26 45 W..	1,555	38.5	glob. oz.....	Common.
10574	U.S.N.M.	10+	D2043...	39 49 00 N.; 68 28 30 W..	1,497	38.5	glob. oz.....	Common.
10575	U.S.N.M.	3	D2052...	39 40 05 N.; 69 21 25 W..	1,098	45	glob. oz.....	Few.
10576	U.S.N.M.	1	D2080...	39 58 50 N.; 70 39 40 W..	108	45	gy. s.....	Rare.
10577	U.S.N.M.	3	D2096...	39 22 20 N.; 70 52 20 W..	1,451	37.5	glob. oz.....	Rare.
10578	U.S.N.M.	7	D2097...	37 55 20 N.; 70 57 30 W..	1,917	.....	glob. oz.....	Few.
10579	U.S.N.M.	4	D2105...	37 50 00 N.; 73 03 50 W..	1,395	41	glob. oz.....	Few.
10580	U.S.N.M.	1	D2111...	35 09 50 N.; 74 57 40 W..	938	.....	gn. m.....	Rare.
10581	U.S.N.M.	3	D2115...	35 49 30 N.; 74 34 45 W..	843	39	m., fne. s....	Few.
10582	U.S.N.M.	1	D2140...	17 37 10 N.; 76 46 05 W..	966	39.7	s.....	Rare.
10583	U.S.N.M.	1	D2150...	13 34 45 N.; 81 21 10 W..	382	45.75	nh. ers. s....	Rare.
10584	U.S.N.M.	1	D2192...	39 46 30 N.; 70 14 15 W..	1,0 0	38.6	gy. oz.....	Rare.
10585	U.S.N.M.	1	D2203...	39 34 15 N.; 71 41 15 W..	705	38.9	gn. m. s.....	Rare.
10586	U.S.N.M.	2	D2204...	39 30 30 N.; 71 44 30 W..	728	39.1	br. m.....	Rare.
10587	U.S.N.M.	3	D2221...	39 05 30 N.; 70 44 30 W..	1,525	35.9	gy. oz.....	Few.
10588	U.S.N.M.	5	D2222...	39 03 15 N.; 70 50 45 W..	1,537	35.9	gy. oz.....	Few.
10589	U.S.N.M.	6	D2226...	37 00 00 N.; 71 54 00 W..	2,045	36.8	glob. oz.....	Few.
10590	U.S.N.M.	1	D2231...	38 29 00 N.; 73 09 00 W..	9 5	36.8	gy. oz.....	Rare.
10591	U.S.N.M.	1	D2234...	39 09 00 N.; 72 03 15 W..	810	38.6	gn. m.....	Rare.
10592	U.S.N.M.	2	D2335...	23 10 39 N.; 82 20 21 W..	204	.....	.....	Rare.
10593	U.S.N.M.	3	D2372...	29 15 30 N.; 85 29 30 W..	27	.....	g.....	Rare.

Trochammina globigeriniformis—material examined.

Cat. No.	Coll. of—	No. of speci-mens.	Station.	Locality.	Depth in fath-oms.	Bot-tom tem-pera-ture.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10594	U.S.N.M.	5	D2381...	28 05 00 N.; 87 56 15 W..	1,330	.....	lt. br. m.....	Few.
10595	U.S.N.M.	3	D2383...	28 32 00 N.; 88 06 00 W..	1,181	39.8	br. gn. m....	Few.
10596	U.S.N.M.	3	D2385...	28 51 00 N.; 88 18 00 W..	730	40.1	gy. m.....	Few.
10597	U.S.N.M.	1	D2525...	11 49 00 N.; 65 49 30 W..	72	43.6	s.g. brk. sh .	Rare.
10598	U.S.N.M.	1	D2542...	40 00 15 N.; 70 42 20 W..	129	47.2	s. brk. sh....	Rare.
10599	U.S.N.M.	4	D2550...	39 44 30 N.; 70 30 45 W..	1,081	38.5	br. m.....	Few.
10600	U.S.N.M.	1	D2552...	39 47 07 N.; 70 35 00 W..	721	39.6	gy. oz.....	Rare.
10601	U.S.N.M.	3	D2562...	39 15 30 N.; 71 25 00 W..	1,431	37.3	gy. oz.....	Few.
10602	U.S.N.M.	3	D2564...	39 22 00 N.; 71 23 30 W..	1,390	37.3	gy. oz.....	Few.
10603	U.S.N.M.	6	D2568...	39 15 00 N.; 68 08 00 W..	1,781	36.9	gy. oz.....	Few.
10604	U.S.N.M.	1	D2570 ..	39 54 00 N.; 67 05 30 W..	1,813	35.8	glob. oz.....	Rare.
10605	U.S.N.M.	1	D2573...	40 34 18 N.; 66 09 00 W..	1,742	37.3	gy. m. s.....	Rare.
10606	U.S.N.M.	1	D2679...	32 40 00 N.; 76 40 30 W..	782	38.6	lt. gy. oz....	Rare.
10607	U.S.N.M.	10+	D2682...	39 38 00 N.; 70 22 00 W..	1,004	.....	gn. m. s.....	Common.
10608	U.S.N.M.	3	D2705...	42 47 00 N.; 61 04 00 W..	1,255	.....	lt. br. oz....	Few.
10609	U.S.N.M.	6	D2706...	41 28 30 N.; 65 35 30 W..	1,188	.....	gy. oz. for...	Few.
10610	U.S.N.M.	2	D2710...	40 06 00 N.; 68 01 30 W..	984	.....	gn. m.....	Few.
10611	U.S.N.M.	2	D2761...	15 39 00 S.; 38 32 54 W..	818	39	pter. oz.....	Few.
10612	U.S.N.M.	1	H47.....	17 46 30 N.; 65 10 25 W..	1,482	.....	ers. co. s. brk. sh. for.	Rare.
10613	U.S.N.M.	1	H48.....	17 42 00 N.; 65 12 40 W..	978	.....	co. oz. for...	Rare.

TROCHAMMINA NANA (H. B. Brady).

Plate 17, fig. 1.

Haplophragmium nanum H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 50; Denkschr. Akad. Wiss. Wien, vol. 43, 1881, p. 99, pl. 2, figs. 1, *a–c*. Ann. Mag. Nat. Hist., ser. 5, vol. 8, 1881, p. 406, pl. 21, fig. 1; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 311, pl. 35, figs. 6–8.—H. B. Brady, Parker, and Jones, Trans. Zool. Soc. London, vol. 14, 1888, p. 218, pl. 41, fig. 20.—Chapman, Journ. Roy. Micr. Soc., 1892, p. 324, pl. 5, fig. 15.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 262, pl. 5, fig. 13–15.—Goës, Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 22, pl. 5, figs. 124–127.—Millett, Journ. Roy. Micr. Soc., 1899, p. 360, pl. 5, fig. 9.—Rhumbler, Zool. Jahrb., vol. 24, 1906, p. 65, pl. 5, fig. 56.—Bagg, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 127.—Awerinzew, Mem. Acad. Imp. Sci., St. Petersbourg, ser. 8, vol. 29, No. 3, 1911, p. 21.—Heron-Allen and Earland, Journ. Roy. Micr. Soc., 1911, p. 309, pl. 9, figs. 9–11.

Trochammina nana Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 123, figs. 190–192.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1010.

Description.—Test small, trochoid, spire depressed, consisting of about two volutions, the last with six or seven chambers, periphery rounded, umbilicate below; chambers inflated, subglobose, somewhat flattened above, sutures distinct; wall arenaceous, thin, smoothly finished; aperture a narrow curved opening at the base of the chamber; color light brown except the last-formed chamber, which is usually gray.

Diameter up to 0.34 mm.

Distribution.—This species seems characteristic of cold or deep waters. It is known from the Arctic, off Franz Josef Land, where it is recorded as "exceedingly abundant at depths from 89–145 fathoms

(163–265 meters)," and on the west shores of Nova Zembla. It is recorded at a few stations off Africa and South America and by Pearcey from the South Atlantic. Awerinzew records it from the Siberian Arctic.

I have not found it in the *Albatross* material, but did find it in the Canadian Arctic Expedition material from the Arctic.

TROCHAMMINA SUBTURBINATA, new species.

Plate 16, figs. 7 and 8.

Description.—Test subglobose, trochoid, spire very low or even sunken, somewhat umbilicate, composed of two or three volutions; chambers inflated, usually five or six in the last-formed volution, sutures distinct and depressed; wall coarsely arenaceous, but the surface smoothly finished but not polished; aperture semicircular or variously shaped, at the base of the chamber; color yellowish brown.

Diameter up to 1.5 mm.

Distribution.—Type specimen (U.S.N.M. No. 10646) from *Albatross* station D2140 in the Caribbean Sea. Other specimens are from the same region, the Gulf of Mexico, and from the northeastern coast of the United States.

This species may be distinguished from *T. globulosa* at once by its texture, color, and less umbilicate form, from *T. globigeriniformis* by its flattened spire and greater number of chambers in the whorl and from *T. turbinata* by its coarser texture and more regular shape.

The aperture may be semicircular or in some cases has a lip extending in and nearly dividing it into separate openings.

Trochammina subturbinata—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		° F.		
10643	U.S.N.M.	6	D2036...	38 52 40 N.: 69 24 40 W..	1,735	38	glob. oz.....	Frequent.
10644	U.S.N.M.	8	D2038...	38 30 30 N.: 69 08 25 W..	2,033	.....	glob. oz.....	Frequent.
10645	U.S.N.M.	10+	D2039...	38 19 26 N.: 68 20 20 W..	2,369	.....	glob. oz.....	Common.
10646	U.S.N.M.	1	D2140...	17 36 10 N.: 76 46 05 W..	966	39.7	s.....	Rare.
10647	U.S.N.M.	10+	D2226...	37 00 00 N.: 71 54 00 W..	2,045	36.8	glob. oz.....	Common.
10648	U.S.N.M.	10+	D2383...	28 32 00 N.: 88 06 00 W..	1,181	39.8	br. gn. m....	Common.
10649	U.S.N.M.	5	D2568...	30 15 00 N.: 68 08 00 W..	1,781	36.9	gy. oz.....	Few.
10650	U.S.N.M.	1	H179.....	14 20 30 N.: 63 10 00 W..	821	.....	co. s. sh. for.	Rare.
10651	U.S.N.M.	1	H182.....	13 29 00 N.: 62 42 40 W..	1,051	.....	for. m. bk. sp	Rare.
10652	U.S.N.M.	1	H188.....	12 29 00 N.: 62 38 30 W..	1,630	.....	m. bk. sp. for	Rare.

TROCHAMMINA TURBINATA (H. B. Brady).

Plate 17, fig 2.

Haplophragmium turbinatum H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 50; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 312, pl. 35, figs. 9, *a–c*.—Egger, Abh. Bay. Akad. Wiss. München, vol 18. 1893, p. 262, pl. 5, figs. 57–59.—Chapman, Proc. Zool. Soc. London, 1895, p. 16.

Trochammina turbinatum Eimer and Fickert, Zeitschr. Wiss. Zool., vol. 65. 1899, p. 695.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1. 1910, p. 122, fig. 189.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1011.

Haplophragmium obsoletum Goës, Bull. Mus. Comp. Zoöl., vol. 29. 1896, p. 31, pl. 3, figs. 14-16.

Description.—Test spiral, early portion regular, low spired, last-formed volution in the adult somewhat irregular and becoming oblique; five to eight chambers in the last-formed volution, umbilicate below, in adults with a depression above due to the obliquity of the last-formed volution; wall arenaceous, variable in coarseness and amount of cement; aperture a narrow curved slit at the base of the ventral side of the chamber; color yellowish or reddish brown or gray.

Diameter 0.75–1.50 mm.

Distribution.—The original *Challenger* records included but one Atlantic station, 346 in 2,350 fathoms (4,298 meters) just south of the equator off the west coast of Africa. Later *Challenger* records include stations 44 in 1,240 fathoms (2,268 meters) off the northeast coast of the United States, 323 in 1,900 fathoms (3,475 meters) off Buenos Aires, and 348 near the first station in 2,450 fathoms (4,481 meters). There are also two stations 142 and 143 off the Cape of Good Hope. Pearcey records it from the South Atlantic and Antarctic in 2,103 and 2,500 fathoms (3,846 and 4,572 meters).

The *Albatross* material has this species from numerous stations from the northeastern coast of the United States and the Gulf of Mexico a few of the stations in comparatively shallow water but half of them average more than 1,500 fathoms (2,743 meters). Examination of the Goës collection shows *Haplophragmium obsoletum* Goës is really *T. turbinatum* although the figures are somewhat conventionalized.

Trochammina turbinata—material examined.

Cat. No.	Coll. of -	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		° F.		
10552	U.S.N.M.	9	D2018...	37 12 22 N.: 74 20 04 W..	788	39	bu. m.....	Common.
10553	U.S.N.M.	1	D2037...	38 53 00 N.: 69 23 30 W..	1,731	38	glob. oz.....	Rare.
10554	U.S.N.M.	1	D2041...	39 22 50 N.: 68 25 00 W..	1,608	38	glob. oz.....	Rare.
10555	U.S.N.M.	1	D2089...	39 58 50 N.: 70 39 40 W..	168	45	g., s.....	Rare.
10556	U.S.N.M.	7	D2097...	37 56 20 N.: 70 57 30 W..	1,917	.....	glob. oz.....	Few.
10557	U.S.N.M.	2	D2160...	23 10 31 N.: 82 20 37 W..	167	.....	co.....	Few.
10558	U.S.N.M.	4	D2221...	39 05 30 N.: 70 44 30 W..	1,525	36.9	g., oz.....	Few.
10559	U.S.N.M.	3	D2222...	39 03 15 N.: 70 50 45 W..	1,537	36.9	gy. oz.....	Few.
10560	U.S.N.M.	1	D2229...	37 38 40 N.: 73 16 30 W..	1,423	37.7	glob. oz.....	Rare.
10561	U.S.N.M.	1	D2231...	38 29 00 N.: 73 09 00 W..	965	36.8	gy. oz.....	Rare.
10562	U.S.N.M.	1	D2372...	29 15 30 N.: 85 29 30 W..	27	.....	g.....	Rare.
10563	U.S.N.M.	1	D2550...	39 44 30 N.: 70 30 45 W..	1,081	38 5	br. m.....	Rare.
10564	U.S.N.M.	1	D2562...	39 15 30 N.: 71 25 00 W..	1,434	37.3..	gy. oz.....	Rare.
10565	U.S.N.M.	1	D2581...	39 43 00 N.: 71 34 00 W..	394	.....	gn. m.....	Rare.

TROCHAMMINA CONGLOBATA H. B. Brady.

Plate 17, fig. 3.

Trochammina conglobata H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 341, pl. 40, figs. 8 9.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 33.—Flint, Ann. Rep. U. S. Nat. Mus., 1897 (1899), p. 281, pl. 26, fig. 2.

Description.—Test convoluted, subglobular, composed of an irregularly coiled test, the coils in a constantly changing direction but close coiled, chambers distinct, of unequal size, inflated; wall finely arenaceous with abundant cement, smooth; aperture a narrow slit at the base of the last-formed chamber; color yellowish brown.

Diameter 1–2 mm.

Distribution.—This species is known only from the western Atlantic, the known range being from the Gulf of Mexico to the coast of Brazil with the following records: *Challenger* 23, in 450 fathoms (823 meters) off Sombrero Island, West Indies; 120 in 675 fathoms (1,234 meters) off Pernambuco, Brazil. Goes records it from *Albatross* H515 in 769 fathoms (1,406 meters) off western Cuba and D2355 in 399 fathoms (730 meters) off Yucatan. Flint records it from D2395 in 347 fathoms (635 meters) in the Gulf of Mexico. I have seen additional material from D2760 in 1,019 fathoms (1,864 meters) off Bahia, Brazil, and H215 off the southeastern coast of Cuba.

The species is in some respects allied to *Haplophragmoides coronata* especially in the character of the wall. From its coiled condition it might as well be placed in *Haplophragmoides* but I have left it in *Trochammina* for the present.

Its range corresponds to that of a number of other species; Gulf of Mexico, the West Indies and Caribbean and the tropical coast of South America.

Trochammina conglobata—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10653	U.S.N.M.	1	D2355...	20 56 18 N.; 86 27 00 W..	399	.....	yl. cz.....	Rare.
10654	U.S.N.M.	5	D2760...	12 07 00 S.; 37 17 00 W..	1,019	39.5	br. co.....	Few.
10699	U.S.N.M.	3	H215....	18 54 30 N.; 75 16 30 W..	1,486	.....	yl. m. brk. sh. f r.	Few.

Genus GLOBOTEXTULARIA Eimer and Fickert, 1899.

Haplophragmium (part) H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 313.

Globotextularia Eimer and Fickert, Zeitschr. Wiss. Zool., vol. 65, 1899, p. 679. (Type, *G. anceps* (H. B. Brady)).—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 125.

Description.—Test arenaceous, the early chambers in a spire, the later ones irregular, globular, *Globigerina*-like, containing only the following species:

GLOBOTEXTULARIA ANCEPS (H. B. Brady).

Plate 17, fig. 4.

Haplophragmium anceps H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 313, pl. 35, figs. 12–15.—Chaster, First Rep. Southport Soc. Nat. Sci., 1890–91 (1892), p. 57, pl. 1, fig. 2.—Millett, Proc. Roy. Micr. Soc., 1899, p. 361, pl. 5, fig. 10.—Earland, Journ. Quekett Micr. Club, ser. 2, vol. 9, 1905, p. 200; Proc. Roy. Irish Acad., vol. 31, pt. 64, 1913, p. 47, pl. 3, fig. 4; Trans. Zool. Soc. London, vol. 20, 1915, p. 615.

Globotextularia anceps Eimer and Fickert, Zeitschr. Wiss. Zool., vol. 65, 1899; p. 679, fig. 25 (in text).—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 125, fig. 196.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1011.

Description.—Test irregular, early portion spiral, with a high spire, compact, later portion with much larger globular chambers, somewhat irregularly placed, typically four in the last volution, inflated; sutures distinct and depressed; wall arenaceous with a fairly smooth surface; aperture near the inner end of the chamber; color various shades of brown.

Diameter, up to 1.5 mm.

Distribution.—The most northerly record for this species is in 1,750 fathoms (3,200 meters) in Davis Strait. The other *Challenger* records give it as far south as nearly 40° S. in the South Atlantic and Pearcey gives a *Scotia* record southeast of the Falklands. Its extent, then, in the Atlantic is wide.

About the British Isles it was found by Chaster at Southport and in the Irish Sea, by Earland at Bognor, and by Heron-Allen and Earland in the Clare Island region on the west coast of Ireland.

I have had *Albatross* material from but four stations, all off the northeastern coast of the United States.

Globotextularia anceps—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10617	U.S.N.M.	6	D2035...	39 26 16 N.; 70 02 37 W..	1,362	.....	glob. oz.....	Few.
10618	U.S.N.M.	1	D2039...	38 19 26 N.; 68 20 20 W..	2,369	.....	glob. oz.....	Rare.
10619	U.S.N.M.	7	D2226...	37 00 00 N.; 71 54 00 W..	2,045	36.8	glob. oz.....	Few.
10620	U.S.N.M.	2	D2581...	39 43 00 N.; 71 34 00 W..	394	.....	gn. m.....	Rare.

Genus AMMOCHILOSTOMA Eimer and Fickert, 1899.

Trochammina (part) H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 58, vol. 21, 1881, p. 52; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 344.—Chapman, The Foraminifera, 1902, p. 151.

Haplophragmium (part) H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 50; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 312.—Chapman, The Foraminifera, 1902, p. 138.

Ammochilostoma (part) Eimer and Fickert, Zeitschr. Wiss. Zool., vol. 65, 1899, p. 692.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 126.—(Type, *A. pauciloculata* (H. B. Brady)=*Trochammina pauciloculata* H. B. Brady.)

Description.—Test free, early chambers spiral, later ones very involute, and the last-formed volution often entirely covering the previously formed chambers and usually at an oblique angle to the earlier growth; wall arenaceous, with a variable, usually excessive amount of cement; aperture at or near the base of the apertural face of the chamber, elongate, narrow, color usually reddish or yellowish brown.

This name was proposed by Eimer and Fickert for three species of *Trochammina*, *T. ringens*, *T. galeata*, and *T. pauciloculata*. As the first of these species has already been included under *Haplophragmoides*, this name, *Ammochilostoma*, may be used for the other two species with others which in their last-formed volution become involute or irregularly winding about the test in a changing plane.

AMMOCHILOSTOMA GALEATA (H. B. Brady).

Trochammina galeata H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 52; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 344, pl. 40, figs. 19–23.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 265, pl. 5, figs. 32–34.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 33.

Ammochilostoma galeata Eimer and Fickert, Zeitschr. Wiss. Zoöl., vol. 65, 1899, p. 692, fig. 39 (in text).—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 127, figs. 193–201.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1011.

Description.—Test subglobular, at least the early chambers spiral and enveloped by the later ones, the last-formed chamber in the adult forming at least half the area of the test; wall finely arenaceous with much cement, smooth; aperture a narrow slit slightly above the base of the apertural face, with slightly protuberant lips; color yellowish brown.

Diameter, 0.5 mm.

Distribution.—There are five Atlantic *Challenger* stations for this species, all but one in 2,200 fathoms (4,024 meters) or more. One, station 24, is off Culebra Island, West Indies, in 390 fathoms (713 meters), the others from deep waters north of the Cape Verde Islands southward to the middle South Atlantic to nearly 40° S. latitude. Pearcey records it from *Scotia* station 459 in 1,998 fathoms (3,654 meters) in mid-Atlantic at 41° 30′ S.

Goës records it from a single *Albatross* station D2383 in 1,181 fathoms (2,160 meters) in the Gulf of Mexico and mentions the Caribbean but gives no station. There is no material of this species in the Goës collection so far as I have been able to determine.

I have had typical specimens from a single *Albatross* station D2568 off the northeastern United States in 1,781 fathoms (3,257 meters).

Ammochilostoma galeata—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
40526	U.S.N.M.	2	D2568...	° ′ ″ ° ′ ″ 39 15 00 N.; 68 08 00 W..	1,781	°F. 36.9	gy. oz.....	Rare.

AMMOCHILOSTOMA PAUCILOCULATA (H. B. Brady).

Trochammina pauciloculata H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, 1879, p. 58, pl. 5, figs. 13–14; Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 344, pl. 41, figs. 1, 2.—Egger, Abh. Bay. Akad. Wiss. München, vol. 18, 1893, p. 265, pl. 5, figs. 37, 38.—Goës, Bull. Mus. Comp. Zoöl., vol. 29, 1896, p. 33.—Flint, Ann. Rep. U. S. Nat. Mus., 1897 (1899), p. 282, pl. 27, fig. 2.—Bagg, Proc. U. S. Nat. Mus., vol. 34, 1907, p. 128.

Ammochilostoma pauciloculata Eimer and Fickert, Zeitschr. Wiss. Zool., vol. 65, 1899, p. 692.—Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 126, fig. 197.—Pearcey, Trans. Roy. Soc. Edinburgh, vol. 49, 1914, p. 1011.

Description.—Test ovoid, early chambers spiral, hidden by the later chambers which are in a plane oblique to the early ones and very involute, inflated, only three or four chambers visible in adult specimens, sutures distinct, depressed; wall finely arenaceous with an excess of cement, surface smooth and polished; aperture an elongate, somewhat arched slit at the base of the chamber; color yellowish or reddish brown, with some of the chambers gray in occasional specimens.

Diameter up to 7.5 mm.

Distribution.—This is a widely distributed species especially in deep cold waters. The *Challenger* records show its distribution from 40° N. to 40° S. at depths ranging from 390 to 2,450 fathoms (713 to 4,481 meters). Pearcey records it from the *Scotia* stations in the South Atlantic 1,998 to 2,103 fathoms (3,654 to 3,846 meters). Egger records it from one *Gazelle* station off the west coast of Africa.

Flint has the species in the *Albatross* material from two stations—D2313 off the Carolina coast and D2568 off Marthas Vineyard—99 and 1,781 fathoms (181 and 3,257 meters).

I have found it as occasional specimens in *Albatross* material from the northeastern coast of the United States, off the coast of Cuba, and in the Caribbean at depths ranging from 167 to 1,806 fathoms (305 to 3,303 meters). At none of these stations could it be called anything but rare, as only occasional specimens were met with.

It is a species that can hardly be mistaken for any other. In some specimens the last formed chamber has a gray color instead of the usual yellowish brown.

Ammochilostoma pauciloculata—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station.	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10527	U.S.N.M.	2	D2034...	39 27 10 N.; 69 56 20 W..	1,346	38	glob. oz.....	Few.
10528	U.S.N.M.	3	D2052...	39 40 05 N.; 69 21 25 W..	1,098	45	glob. oz.....	Few.
10529	U.S.N.M.	1	D2160...	23 10 31 N.; 82 20 37 W..	167	.....	co.....	Rare.
10530	U.S.N.M.	1	D2202...	39 38 00 N.; 71 39 45 W..	515	39.1	gn. m.....	Rare.
10531	U.S.N.M.	1	D2204...	39 30 30 N.; 71 44 30 W..	728	39.1	br. m.....	Rare.
10532	U.S.N.M.	7	D2205...	39 35 00 N.; 71 18 45 W..	1,073	38.1	gy. oz.....	Few.
10533	U.S.N.M.	3	D2221...	39 05 30 N.; 70 44 30 W..	1,525	36.9	gy. oz.....	Few.
10536	U.S.N.M.	4	D2350...	39 44 30 N.; 70 30 45 W..	1,081	38.5	br. m.....	Few.
10534	U.S.N.M.	1	D2568...	39 15 00 N.; 68 08 00 W..	1,781	36.9	gy. oz.....	Rare.
10535	U.S.N.M.	1	D2573...	40 34 18 N.; 66 09 00 W..	1,742	37.3	gy.m.s.....	Rare.
10537	U.S.N.M.	4	D2706...	41 28 30 N.; 65 35 30 W..	1,188	.....	gy. oz. for....	Few.
10538	U.S.N.M.	1	H82.....	13 29 00 N.; 62 42 40 W..	1,051	.....	for. m. bk. sp.	Rare.
10539	U.S.N.M.	1	H131....	12 04 00 N.; 66 16 40 W..	1,896	.....	choc. oz. for..	Rare.

Genus AMMOSPHAEROIDINA Cushman, 1910.

Haplophragmium (part) H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 313.—Howchin, Trans. Roy. Soc. South Australia, vol. 12, 1889, p. 6.—Chapman, The Foraminifera, 1902, p. 178; Journ. Linn. Soc., Zool., vol. 30, 1907, p. 24.

Ammosphaeroidina Cushman, Bull. 71, U. S. Nat Mus., pt. 1, 1910, p. 128.—(Type, *Haplophragmium sphaeroidiniformis* H. B. Brady).

Description.—Test globose, arenaceous, early portion spiral, later chambers like *Sphaeroidina* in form, embracing; aperture rounded, at one side of the chamber in the adult.

This genus in its general external characters much resembles *Sphaeroidina*, but has a rather coarse arenaceous test.

AMMOSPHAEROIDINA SPHAEROIDINIFORMIS (H. B. Brady).

Plate 17, fig. 5.

Haplophragmium sphaeroidiniformis H. B. Brady, Rep. Voy. *Challenger*, Zoology, 1884, p. 313.—Howchin, Trans. Roy. Soc. South Australia, vol. 12, 1889, vol. 9, p. 6.—Chapman, Journ. Linn. Soc., Zool., vol. 30, 1907, p. 24, pl. 3, figs. 50, 51; vol. 30, 1910, p. 401.

Ammosphaeroidina sphaeroidiniformis Cushman, Bull. 71, U. S. Nat. Mus., pt. 1, 1910, p. 128, fig. 202.—Cushman, Proc. U. S. Nat. Mus., vol. 56, 1919, p. 600.

Description.—Test free, subglobose, early portion spiral, later portion in adult specimens typically made up of three large globose chambers similar in form and arrangement to *Sphaeroidina bulloides*, one large one at one side and two smaller ones at the other, the aperture at the inner side of the last-formed chamber, semicircular or rounded; wall rather coarsely arenaceous; color brownish or gray.

Diameter, 0.75–1.75 mm.

Distribution.—The *Albatross* stations here given are along the eastern coast of the United States, in the Gulf of Mexico, and in the Caribbean.

The species has undoubtedly been confused with *Trochammina globigeriniformis* in many earlier records. The original specimens were from the Mediterranean. It is recorded from the Tertiary of Australia (Chapman) and as a recent species from off Funafuti (Chapman) and in the North Pacific (Cushman).

Ammosphaeroidina sphaeroidiniformis—material examined.

Cat. No.	Coll. of—	No. of specimens.	Station	Locality.	Depth in fathoms.	Bottom temperature.	Character of bottom.	Abundance.
				° ′ ″ ° ′ ″		°F.		
10540	U.S.N.M.	1	D2046...	40 02 49 N.; 68 49 00 W..	407	40	bu. m.....	Rare.
10541	U.S.N.M.	2	D2110...	35 12 10 N.; 74 57 15 W..	516	40	bu. m.....	Rare.
10542	U.S.N.M.	1	D2115...	35 49 30 N.; 74 34 45 W..	843	39	m. fne. s....	Rare.
10543	U.S.N.M.	1	D2150...	13 34 45 N.; 81 21 10 W..	382	45.75	wh. crs. s....	Rare.
10544	U.S.N.M.	1	D2399...	28 44 00 N.; 86 18 00 W..	196	51.6	gy. m.....	Rare.
10545	U.S.N.M.	1	D2530...	40 53 30 N.; 66 24 00 W..	956	38 4	gy. oz.....	Rare.
10546	U.S.N.M.	1	D2568...	39 15 00 N.; 68 08 00 W..	1,781	36.9	gy. oz.....	Rare.
10614	U.S.N.M.	8	D2677...	32 39 00 N.; 76 50 30 W..	478	39.3	gn. m.....	Few.
10547	U.S.N.M.	3	H82.....	13 29 00 N.; 62 42 40 W..	1,051	.....	for. m. bk. sp.	Few.

Subfamily Neusininae.

Genus BOTELLINA W. B. Carpenter, 1869.

Botellina W. B. Carpenter, Proc. Roy. Soc. London, vol. 18, 1869, p. 444. (Type, *B. labyrinthica*, H. B. Brady).—Bütschli, in Bronn, Klassen und Ordnungen Thierreichs, vol. 1, 1880, p. 193.—H. B. Brady, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 279.—Rhumbler, Arch. Prot., vol. 3, 1903, p. 261.—Pearcey, Trans. South African Philos. Soc., vol. 17, pt. 2, 1908, p. 188.

Description.—For the generic description, see under *B. labyrinthica* which immediately follows.

BOTELLINA LABYRINTHICA H. B. Brady.

Plate 18, figs. 1–4.

Botellina, species, W. B. Carpenter, Proc. Roy. Soc. London, vol. 18, 1869, p. 444.

Botellina labyrinthica H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, 1881, p. 48, Rep. Voy. *Challenger*, Zoology, vol. 9, 1884, p. 279, pl. 29, figs. 8–18.—Goës; Köngl. Svensk. Vet. Akad. Handl., vol. 25, No. 9, 1894, p. 19, pl. 4, figs. 69–86.—Schaudinn, Bergens Mus. Aarbog, 1894–95, No. 9, p. 5.—Chapman, The Foraminifera, 1902, p. 128, pl. 6, fig. 1.—Rhumbler, Arch. Prot., vol. 3, 1903, p. 261, fig. 103 (in text).—Heron-Allen and Earland, Trans. Linn. Soc. London, vol. 11, pt. 13, 1916, p. 221.

Description.—"Test arenaceous, cylindrical, straight or slightly curved, somewhat irregular in outline, one end rounded and more or less swollen (the natural condition of the other end not certainly known); walls of the test of firm consistence, rough, without external fine cement, subdivided irregularly by a labyrinth of sand grains cemented together at various angles forming rude chamberlets which open out into a main tube or chamber, which runs through nearly the whole test.

Incomplete specimens only known."

Type species.—Botellina labyrinthica H. B. Brady.

The above is the generic description given by Pearcey based on the type species. Pearcey obtained another species of *Botellina* from South Africa which seems to show that this may really be a many chambered genus and if so should probably be placed with *Neusina* in the subfamily already made for that genus. The chamberlet condition in the two is similar in certain respects.

Length of *B. labyrinthica* 25 mm. or more.

Distribution.—Type locality, *Porcupine* station 51, latitude 60° 6′ N.; longitude 8° 14′ W. in 440 fathoms (805 meters), bottom temperature 42° F. There are a few specimens in the United States National Museum No. 6247 from this station received from Dr. W. B. Carpenter. Other records are in the same general region. The specimens figured by Goës under this name are not this species or at least do not show the full characters. Schaudinn records the species from Bergen, Norway, but figures no specimens. Pearcey notes the following records—"It was again met with by the Naturalists of the *Knight Errant* and *Triton* expeditions in 1880 and 1882, but always in a fragmentar ycondition in the same areas [as the type station, Faroe Channel] at a depth of 516 fathoms (944 meters) in the warm area, and in 580 fathoms (1,061 meters) in the cold area with a bottom temperature 46.5° and 31° F. (8 and —0.5° C.), respectively. It would thus appear to be more common in the cold area, where it was taken in the greatest abundance, strongly indicating that it favors a low temperature."

"In 1886 Mr. Joseph Wright, F. G. S. (J. Wright, second dredging cruise of the S. S. *Protector,* Belfast Nat. Field Club, 1886) again records *B. labyrinthica* as having been obtained in considerable abundance in a dredging taken about midway between Belfast Lough and Port Patrick, at a depth of 100 fathoms (183 meters) and again in September, 1902 [1] (from washings of dredged material from Rathlin Sound, Church Bay, in 17–24 fathoms (31–44 meters), but he makes no mention of the temperature of the water."

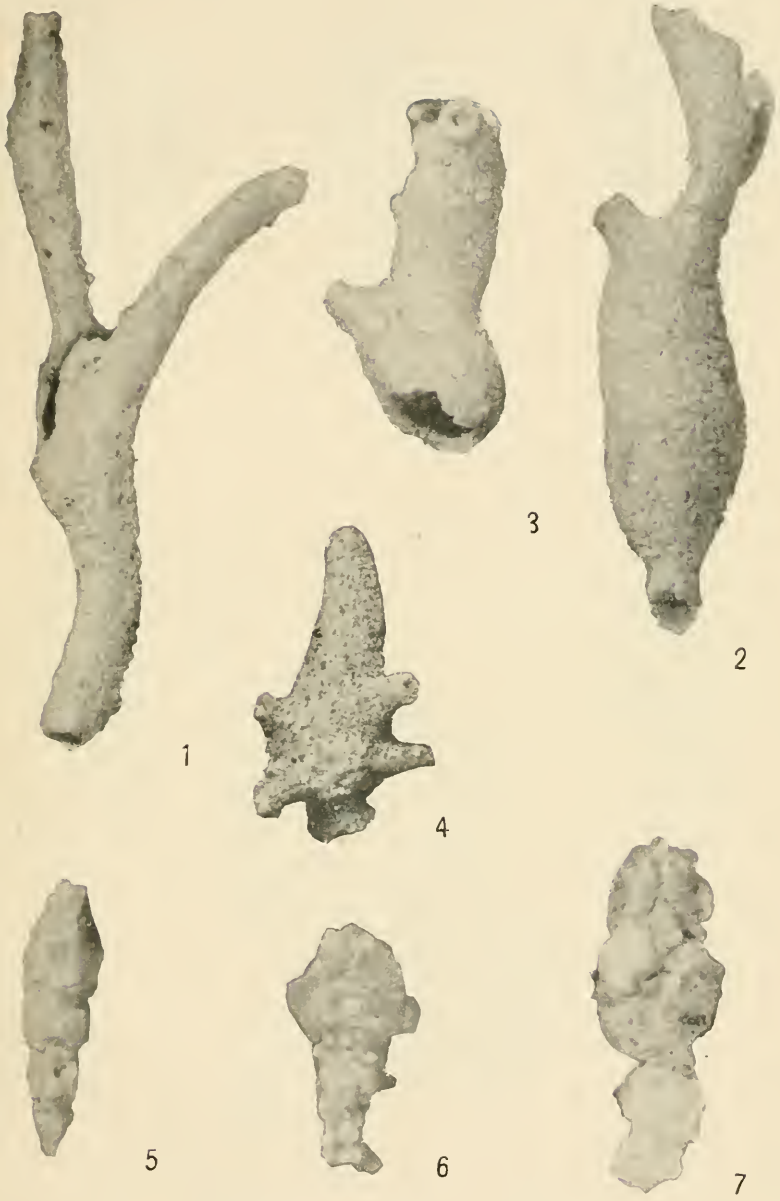
Heron-Allen and Earland obtained fragments of this species at two *Runa* stations off the west of Scotland in 30 and 60 fathoms (55 and 110 meters).

[1] J. Wright, Foraminifera from Rathlin Island, Irish Nat., vol. 11, pp. 210–213.

EXPLANATION OF PLATES.

Plate 1.

Fig. 1. *Aschemonella ramuliformis*. × 15. D2150, U.S.N.M. No. 10642.
2. *Aschemonella catenata*. × 20. D2226, U.S.N.M. No. 10140*a*.
3. *Aschemonella catenata*. × 20. D2226, U.S.N.M. No. 10140*b*.
4. *Aschemonella catenata*. × 20. D2226, U.S.N.M. No. 10140*c*.
5. *Reophax scorpiurus*. × 25. Montego Bay, Jamaica.
6. *Reophax scorpiurus*. × 25. *Goldseeker*, U.S.N.M. No. 10198*b*.
7. *Reophax scorpiurus*. × 20. D2531, U.S.N.M. No. 10196*a*.



LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 90.

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LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 91.

Plate 2.

Fig. 1. *Reophax pilulifer*. × 20. D2097, U.S.N.M. No. 10184*a*.
2. *Reophax curtus*. × 20. D2458, U.S.N.M. No. 10669*b*.
3. *Reophax curtus*. × 25. D2458, U.S.N.M. No. 10669*a*.
4. *Reophax agglutinatus*. × 20. D2550, U.S.N.M. No. 10667.
5. *Reophax agglutinatus*. × 20. D2550, U.S.N.M. No. 10667*a*.
6. *Reophax agglutinatus*, var. *glomeratus*. × 10. D2043, U.S.N.M. No. 10656*c*.

PLATE 3.

FIG. 1. *Reophax agglutinatus*, var. *glomeratus*. × 10. D2043, U.S.N.M. No. 10656*a*.
2. *Reophax agglutinatus*, var. *glomeratus*. × 10. D2043, U.S.N.M. No. 10657*a*.
3. *Reophax bilocularis*. × 20. D2679, U.S.N.M. No. 10135*b*.
4. *Reophax bilocularis*. × 15. D2679, U.S.N.M. No. 10135*a*.
5. *Reophax distans*. × 20. D2568, U.S.N.M. No. 10116*a*.
6. *Reophax distans*. × 25. D2568, U.S.N.M. No. 10116*b*.
7. *Reophar guttifer*. × 20. D2038, U.S.N.M. No. 10201.

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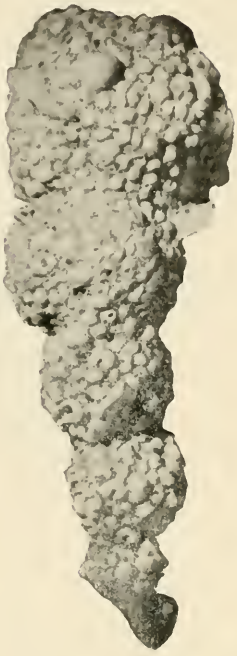

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LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 92.

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LITUOLIDAE OF THE ATLANTIC OCEAN.

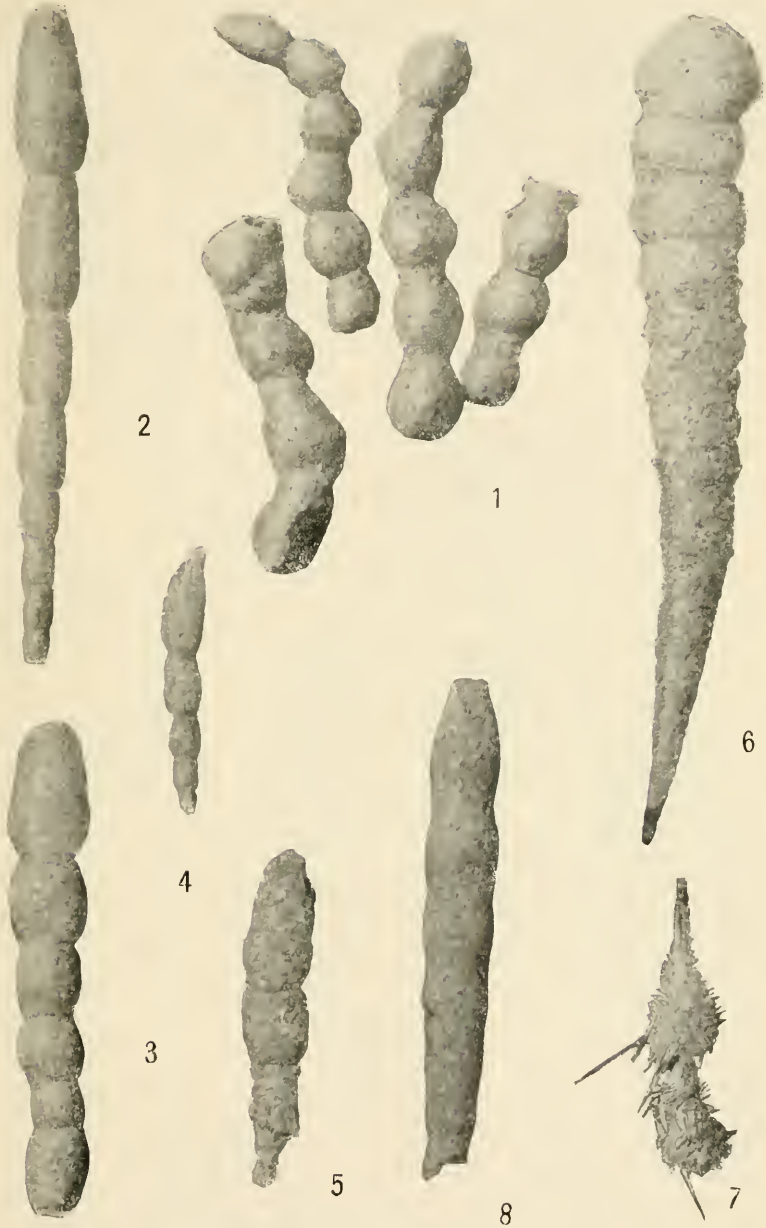
FOR EXPLANATION OF PLATE SEE PAGE 93.

Plate 4.

Fig. 1. *Reophax distans*, var. *turbo*. × 75.
2. *Reophax distans*, var. *delicatulus*. × 150.
3. *Reophax robustus*, var. *septentrionalis*. × 10. D2084, U. S.N.M. No. 10662.
4. *Reophax robustus*, var. *septentrionalis*. × 10. D2572, U.S.N.M. No. 10663*a*.
5. *Reophax robustus*, var. *septentrionalis*. × 10. D2572. U.S.N.M. No. 10663.

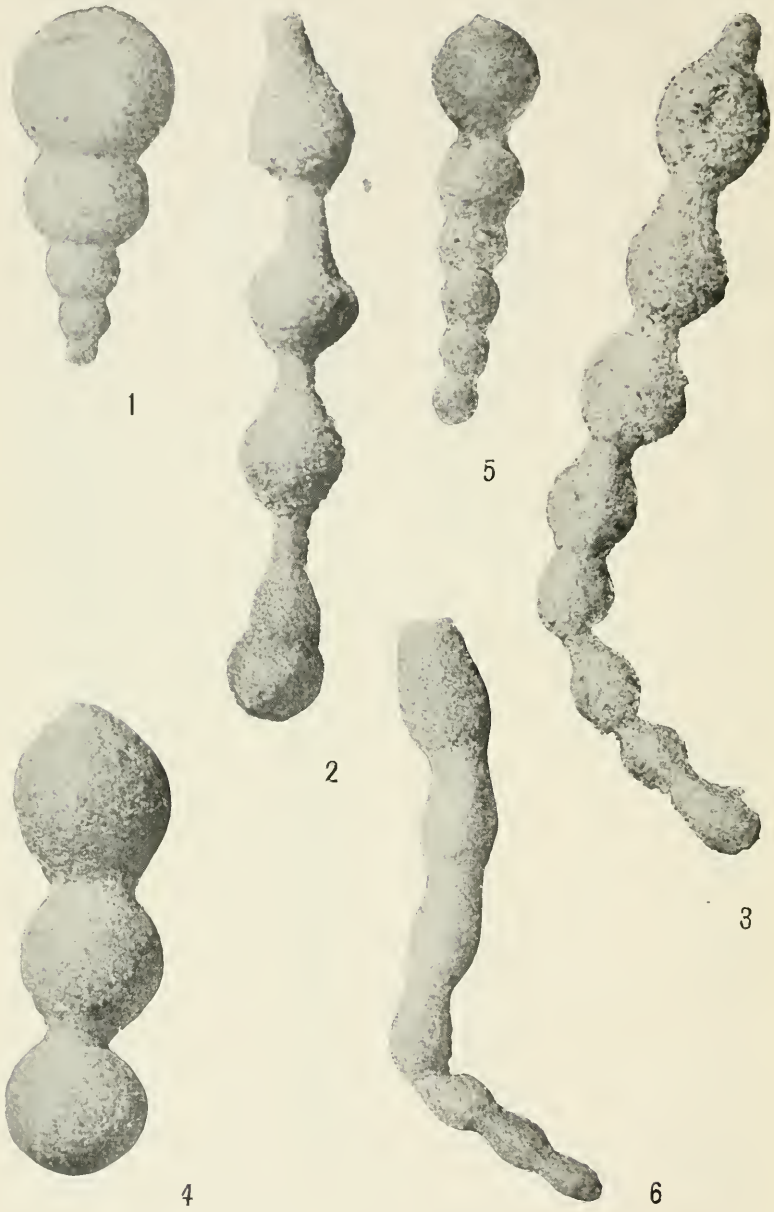
Plate 5.

Fig. 1. *Reophax aduncus.* × 20. D2221, U.S.N.M. No. 10098.
2. *Reophax nodulosus.* × 20. D2383, U.S.N.M. No. 10119.
3. *Reophax nodulosus.* × 15. D2568, U.S.N.M. No. 10124*a*.
4. *Reophax dentaliniformis.* × 25. D2160, U.S.N.M. No. 10159*a*.
5. *Reophax dentaliniformis.* × 25. D2111, U.S.N.M. No. 10157*a*.
6. *Reophax bacillaris.* × 20. D2043, U.S.N.M. No. 10212*b*.
7. *Reophax hispidulus.* × 25. D2677, U.S.N.M. No. 10670.
8. *Reophax cylindricus.* × 15. D2222, U.S.N.M. No. 10130.



LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 94.



LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 95

PLATE 6.

FIG. 1. *Hormosina globulifera*. × 15. D2076, U.S.N.M. No. 10040*a*.
2. *Hormosina ovicula*. × 20. D2399, U.S.N.M. No. 10071*a*.
3. *Hormosina ovicula*, var. *mexicana*. × 10. D2150, U.S.N.M. No. 10080*a*
4. *Hormosina monile* × 20. D2385, U.S.N.M. No. 10075*a*.
5. *Hormosina ovaliformis*. × 20. D2385, U.S.N.M. No. 10065.
6. *Hormosina carpenteri*. × 10 D2038, U.S.N.M. No. 10078*a*.

Plate 7.

Fig. 1. *Hormosina normani.* × 15. D2766, U.S.N.M. No. 10090*a*.
2. *Haplostiche dubia.* × 15. Megalospheric form. D2404, U.S.N.M. No 10229*b*.
3. *Haplotische dubia.* × 15. Microspheric form. D2004, U.S.N.M, No. 10029*a*.
4. *Haplostiche dubia*, var. *intermedia.* × 10. Off Barbados, 100 fathoms. *Hassler.*

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LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 96.

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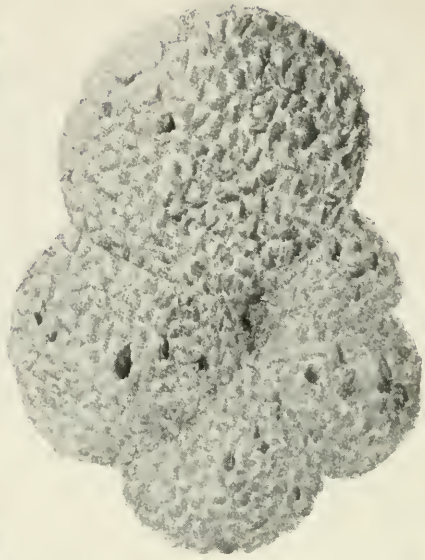

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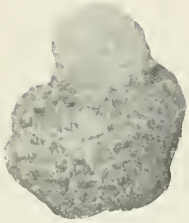

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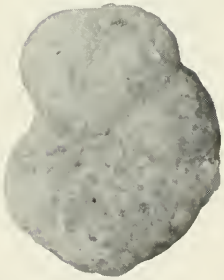

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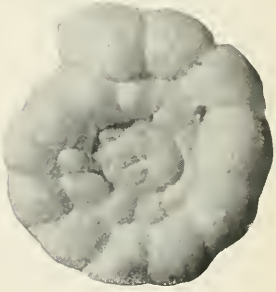

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LITUOLIDAE OF THE ATLANTIC OCEAN.

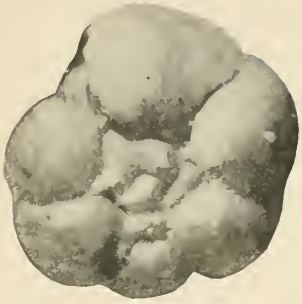
FOR EXPLANATION OF PLATE SEE PAGE 97.

PLATE 8.

FIG. 1. *Haplophragmoides canariensis*. × 20. D2003, U.S.N.M. No. 10294*a*.
2. *Haplophragmoides scitulum*. × 20. D2568, U.S.N.M. No. 10277*a*.
3. *Haplophragmoides sphaeriloculum*. × 50.
4. *Haplophragmoides emaciatum*. × 20. D2547, U.S.N.M No. 10350*a*.
5. *Haplophragmoides subglobusum*. × 25. D2563, U.S.N.M. No. 10317*a*.
6. *Haplophragmoides major*. × 15. D2453, U.S.N.M. No. 10676*a*.
7. *Trochamminoides proteus*. × 20. D2383, U.S.N.M. No. 10616*a*.

PLATE 9.

FIG. 1. *Haplophragmoides coronata.* × 20. D2751, U.S.N.M. No. 10282*a*.
2. *Haplophragmoides ringens.* × 20. D2383, U.S.N.M. No. 10246*a*.
3. *Haplophragmoides rotulatum.* × 50. (After Brady.)
4. *Haplophragmoides rotulatum.* × 50. (After Brady.)
5. *Haplophragmoides trullissata.* × 50. (After Brady.)
6. *Haplophragmoides glomeratum.* × 75. (After Brady.)



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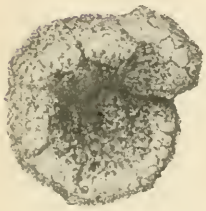

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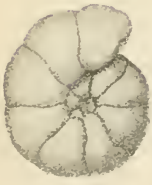

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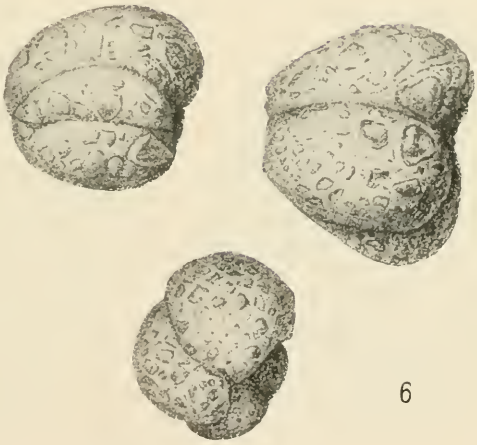

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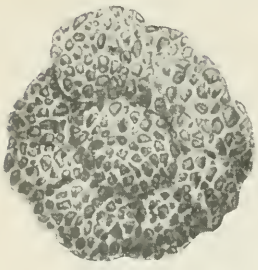
LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 98.



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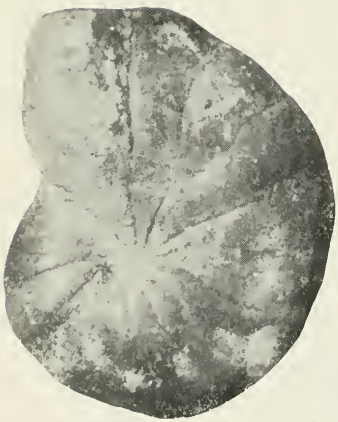

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LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 99.

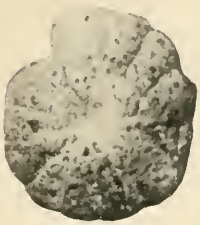
Plate 10.

Figs. 1 and 2. *Haplophragmoides runianum.* (After Heron-Allen and Earland). Fig. 1, × 113; fig. 2, × 150.

3. *Cribrostomoides bradyi.* × 20. D2043, U.S.N.M. No. 10366*a*.
4. *Cyclammina cancellata.* × 15. D2678, U.S.N.M. No. 10452*a*
5. *Cyclammina cancellata.* × 15. *Porcupine* (from W. B. Carpenter, U.S.N.M. No. 6250.)

Plate 11.

Fig. 1. *Cyclammina compressa.* × 15. D2203, U.S.N.M. No. 10393*a*.
2. *Cyclammina pauciloculata.* × 15. D2399, U.S.N.M. No. 10422*a*.
3. *Cyclammina bradyi.* × 20. D2542, U.S.N.M. No. 10432.
4. *Cyclammina pusilla.* × 15. (After Brady.)
5. *Cyclammina pusilla.* × 15. (After Brady.) Section.
6. *Cyclammina pusilla.* × 30. (After Brady.) Section.
7. *Cyclammina orbicularis.* × 15. (After Brady.)
8. *Cyclammina orbicularis.* × 15. (After Brady.) Section.
9. *Cyclammina orbicularis.* (After Brady.) Section.



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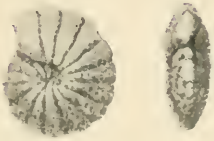

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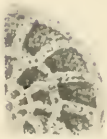

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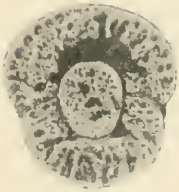

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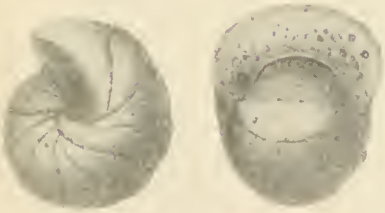

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LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 100.

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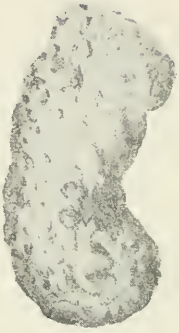

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LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 101.

PLATE 12.

FIG. 1. *Lituotuba lituiformis.* × 20. H80, U.S.N.M. No. 10467.
2. *Lituotuba lituiformis.* × 15. H405, U.S.N.M. No. 10472*a*.
3. *Ammobaculites agglutinans.* × 20. D2043, U.S.N.M. No. 10499.
4. *Ammobaculites pseudospirale.* × 35. (After Williamson.)
5. *Ammobaculites cassis.* × 35. (After Brady.)
6 and 7. *Ammobaculites americanus.* × 20. (After Brady.)

PLATE 13.

FIG. 1. *Ammobaculites foliaceus.* × 25. D2039. U.S.N.M. No. 10485.
2. *Ammobaculites foliaceus.* × 25. D2039, U.S.N.M. No. 10485.
3. *Ammobaculites tenuimargo.* × 75. Microspheric form, by transmitted light.
4 and 5. *Ammobaculites tenuimargo.* × 20. D2018, U.S.N.M. No. 10473*a*.
6. *Ammobaculites reophaciformis.* × 25. Montego Bay, Jamaica.
7. *Haplophragmium lituolinoideum.* × 15. D2706, U.S.N.M. No. 10696*a*.

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LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 102.

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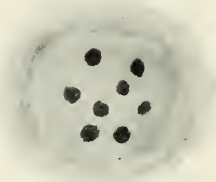

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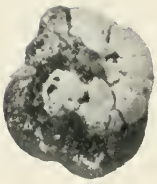

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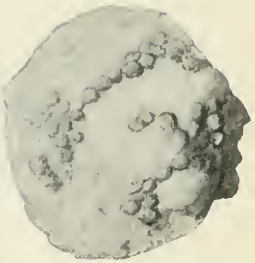

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LITUOLIDAE OF THE ATLANTIC OCEAN.

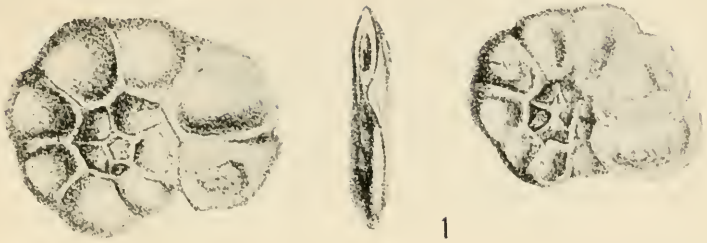
FOR EXPLANATION OF PLATE SEE PAGE 103.

PLATE 14.

FIG. 1. *Lituola mexicana.* × 40. End view.
2. *Lituola mexicana.* × 30. Last chambers in section.
3. *Lituola mexicana.* × 30. Pores of the interior wall of one of the earlier chambers.
4. *Lituola mexicana.* × 15. D2399, U.S.N.M. No. 10698a.
5. *Placopsilina cenomana.* × 20. D2371, U.S.N.M. No. 10551.
6. *Placopsilina confusa.* × 20. D2115, U.S.N.M. No. 10549.

Plate 15.

Fig. 1. *Trochammina inflata*, var. *macrescens*. × 90 (After Brady.)
2. *Trochammina nitida*. × 50. (After Brady) *a*, dorsal view, *b*, ventral view, *c*, apertural end.
3. *Trochammina ochracea*. × 125. (After Williamson.)
4. *Trochammina plicata*. (After Balkwill and Wright.)
5. *Trochammina bradyi*. × 100. (After Wright.)



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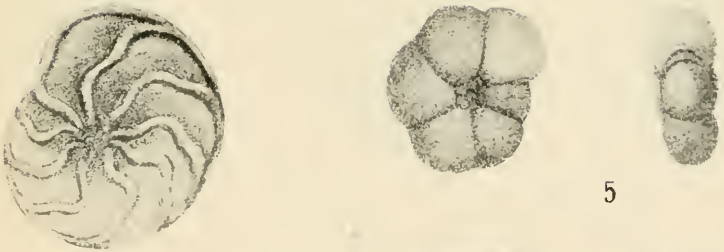

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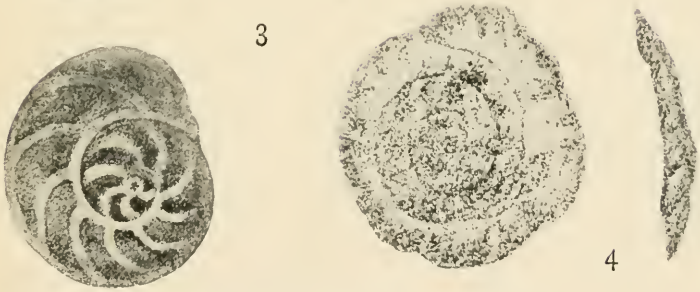

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LITUOLIDAE OF THE ATLANTIC OCEAN.

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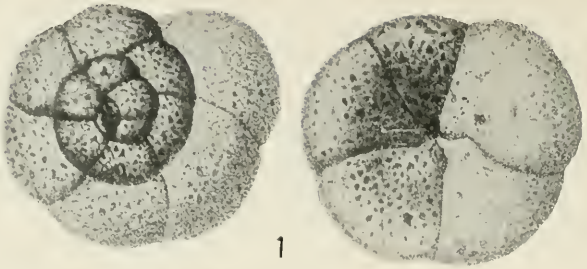

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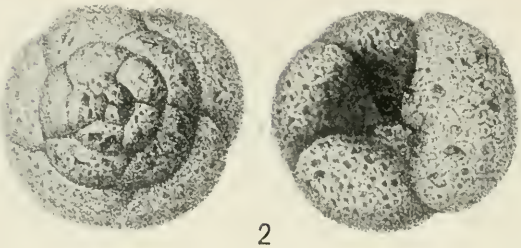

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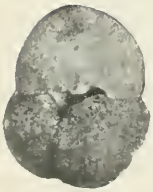

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LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 105.

Plate 16.

Figs. 1 and 2. *Trochammina rotaliformis*. × 150. (After Balkwill and Wright.)

3. *Trochammina globulosa*. × 20. D2041, U.S.N.M. No. 10623*a*, dorsal view.
4. *Trochammina globulosa*. × 20. D2041, U.S.N.M. No. 10623*b*, ventral view.
5. *Trochammina globigeriniformis*. × 20. D2038, U.S.N.M. No. 10570*a*, dorsal view.
6. *Trochammina globigeriniformis*. × 20. D2682, U.S.N.M. No. 10607*a*, ventral view.
7. *Trochammina subturbinata*. × 20. D2383, U.S.N.M. No. 10648*a*, dorsal view.
8. *Trochammina subturbinata*. × 20. D2383, U.S.N.M. No. 10648*a*, ventral view.

Plate 17.

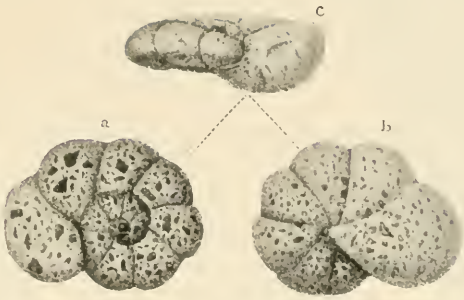
Fig. 1. *Trochammina nana*. × 120. (After Brady) *a*, dorsal view, *b*, ventral view, *c*, apertural view.

2. *Trochammina turbinata*. × 20. D2289, U.S.N.M. No. 10560*a*.

3. *Trochammina conglobata*. × 20. D2355, U.S.N.M. No. 10653.

4. *Globotextularia anceps*. × 15. D2226, U.S.N.M. No. 10619*a*.

5. *Ammosphaeroidina sphaeroidiniformis*. × 20. D2110, U.S.N.M. No. 10541*a*.



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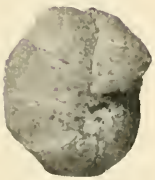

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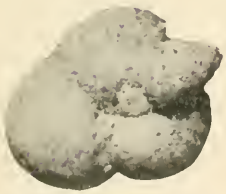

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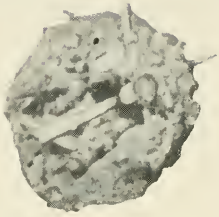
5

LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 106.

1



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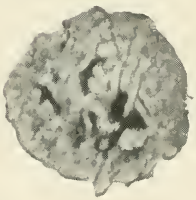

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2

LITUOLIDAE OF THE ATLANTIC OCEAN.

FOR EXPLANATION OF PLATE SEE PAGE 107.

PLATE 18.

FIG. 1. *Botellina labyrinthica.* × 10. *Porcupine* 51. U.S.N.M. No. 6247, exterior.
2. *Botellina labyrinthica.* × 10. *Porcupine* 51. U.S.N.M. No. 6247, longitudinal section.
3 and 4. *Botellina labyrinthica.* × 10. Transverse sections (same station).

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